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FOREWORD

The problems of health care in rural areas have long occupied a special niche in policies designed to advance the Nation's health. Programs for recruitment, training, and deployment of health care personnel, for constructing health care facilities, and for financing health care often have included special provisions for rural areas. These programs have often also included attempts to mitigate the negative impacts on rural areas of policies primarily designed for and responsive to the needs of urban areas. However, some rural areas continue to have high numbers of hospital closures, ongoing problems in recruiting and retaining health personnel, and difficulty in providing medical technologies commonly available in urban areas. Mounting concerns related to rural residents' access to health care prompted the Senate Rural Health Caucus to request that OTA conduct an assessment of these and related issues. This Staff Paper was prepared in connection with that assessment.

Rural definitions may greatly influence the costs and effects of health policies, because the size and composition of the U.S. rural population and its health care resources vary markedly depending on what definitions are used. There is no uniformity in how rural areas are defined for purposes of Federal program administration or distribution of funds. This paper examines dichotomous designations used to define rural and urban areas and discusses how they are applied in certain Federal programs. In addition, several typologies are described that are useful in showing the diversity that exists within rural areas. These typologies may be helpful in identifying unique health service needs of rural subpopulations.

A second OTA paper, *Rural Emergency Medical Services*, will also precede the publication of OTA's full assessment on *Rural Health Care*.

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Defining "Rural" Areas: Impact on Health Care Policy and Research

by

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1. SUMMARY

It is difficult to quantify rural health problems and to make informed policy decisions without a clear definition of what and where "rural" areas are. Small population, sparse settlement, and remoteness are all features intuitively associated with "rural." These features exist on a continuum, however, while Federal policies usually rely on dichotomous definitions.

Urban and rural areas are often defined using the designations of either the Office of Management and Budget (OMB) or the Bureau of the Census. Rural areas are the remaining areas that are not captured in either OMB's "metropolitan statistical area" (MSA) designation or in Census' urban or urbanized area definitions. Counties are the building blocks of OMB's MSAs and are easy to use, because county-based data are readily available. One or more counties form an MSA on the basis of population size and density, plus the degree of area-wide economic integration as reflected in commuting patterns. The Census' urban and urbanized area definitions rely on settlement size and density without following county boundaries, making them more difficult to use. Both methods identify about a quarter of the U.S. population as rural or "nonmetropolitan," but these populations are not identical. For example, about 40 percent of the Census-defined rural population live within MSAs, and 14 percent of the MSA population live in Census-defined rural areas. The Census' rural population includes residents of small towns and cities but excludes those living in towns larger than 2,500, many of whom might be considered rural. MSAs can include areas that are sparsely populated and could be considered rural, while nonmetropolitan areas show significant within-area variation.

There is no uniformity in how rural areas are defined for purposes of Federal program administration or distribution of funds. Different designations may be used by the same agency. For example, Congress directed the Health Care Financing Administration to use Census' nonurbanized area designation to certify health facilities under the Rural Health Clinics Act, but to use OMB's MSA/nonMSA designations to categorized hospitals as urban or rural for purposes of hospital reimbursement under Medicare. In general, rural hospitals are reimbursed less than their urban counterparts. While persistent differences between metropolitan and nonmetropolitan hospital costs have been observed, hospital location may be a correlate rather than a determinant of cost differences. Therefore, hospital-specific measures are being sought that might replace the present MSA adjustments to the basic prospective payment formula. Typologies that categorize counties according to their degree of urbanization or their employment and commuting patterns could be used to refine the definition of labor market areas, an important component of the Medicare formula.

There have been calls to develop a standard rural typology that would capture the elements of rural diversity and improve the use and comparison of nationally collected data. These typologies usually are based on the following features: population size and density; urbanization; adjacency and relationship to an MSA; and principal economic activity. Although a standard typology may be desirable, it will be difficult to arrive at, because the different typologies have merit for various purposes. Nevertheless, there continues to be a need for a standardized nonmetropolitan typology. It is especially important to display vital and health statistics in a standardized way, because markedly different conclusions can be reached, depending on the definition of rural used. Better measures of population concentration or dispersion within counties would be helpful--especially for sparsely settled "frontier" areas --to distinguish between urban and rural areas within the same counties.

2. INTRODUCTION

Although there has been widespread concern regarding a "health care crisis" in rural areas, there is little agreement as to what rural areas are. How rural areas (or rural populations) are defined is far from academic, since urban/rural designations are basic to participation in certain Federal programs and to payment rates from Federal sources. Indeed, the perceived magnitude of rural health care problems and the impact of any change in public policy depend on how rural is defined.

The features most intuitively associated with rurality are small populations, sparse settlement, and remoteness or distance from large urban settlements. Historically, rural populations have been distinguished from urban ones by their dependence on farming occupations and by differences in family size, lifestyle, and politics (13). However, because of dramatic improvements in transportation and communication, migration to and from rural areas, and diversification of the rural economy, these clear distinctions no longer exist. The presence of farms, mining areas, and forests in rural areas contribute to persistent differences, most notably lower population densities (13). By 1980, however, over two-thirds of the work force both inside and outside of metropolitan areas were employed in three industries--service, manufacturing, and retail trade (49).

The purpose of this staff paper is to:

1. describe the principal "rural" definitions applied by the Federal Government that affect health programs and policies--i.e., urban and rural areas (and populations) as defined by the Bureau of the Census and metropolitan statistical areas as defined by the Office of Management and Budget;
2. describe the classifications used to distinguish different types of rural areas;
3. discuss how Federal agencies have used these definitions to compile vital and health statistics and to implement programs; and
4. discuss the strengths and weaknesses of rural definitions and classifications currently in use.

3. DELINEATING "RURAL" AND "URBAN" AREAS

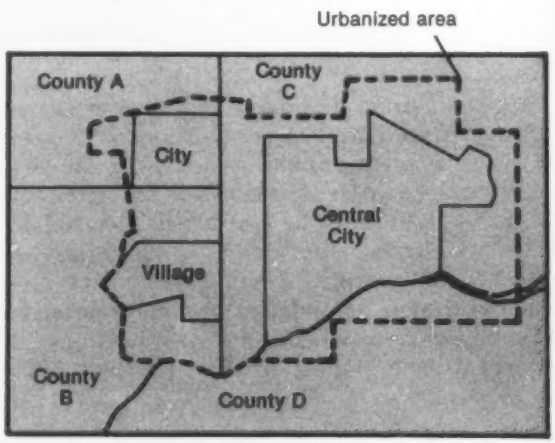
The concepts of "rural" and "urban" now exist as part of a continuum. While few would argue about the extremes of that continuum--e.g., an isolated farming community in Texas at one extreme and New York City at the other--where to draw the line between urban and rural has become more difficult. Many Federal policies, however, rely on dichotomous rural/urban designations. This section describes the two most important dichotomous geographic designations: the Bureau of the Census' urban and rural areas (and populations), and the Office of Management and Budget's (OMB) metropolitan statistical areas and residual nonmetropolitan territory. Several geographic classification schemes are then described that portray the urban-rural continuum.

U.S. Bureau of the Census

According to the Census Bureau, urban and rural are "type-of-area concepts rather than specific areas outlined on maps" (50). The *urban population* includes persons living in urbanized areas (see below) and those living in places with 2,500 residents or more outside of urbanized areas. The population *not classified as urban* comprise the *rural population*; i.e., those living outside of urbanized areas in "places" with less than 2,500 residents and those living outside of "places" in the open countryside. Census-recognized "places" are either: 1) incorporated places such as cities, boroughs, towns, and villages; or 2) closely settled population centers that are outside of urbanized areas, do not have corporate limits, and have a population of at least 1,000.[1] The rural population is divided further into farm (see below) and nonfarm populations.

Urbanized areas consist of a central core (a "central city or cities") and the contiguous, closely settled territory outside the city's political boundaries (the "urban fringe") that combined have a total population of at least 50,000 (48). The boundary of an urbanized area is based primarily on a residential population density of at least 1,000 persons per square mile (the area generally also includes less densely settled areas, such as industrial parks) (49). The boundaries of urbanized areas are not limited to preexisting county or State lines; rather they often follow the boundaries of small Census-defined geographic units such as census tracts and enumeration districts. Many urbanized areas cross county and/or State lines (see figure 1).

Figure 1.--Urbanized Areas



SOURCE: U.S. Department of Commerce, Bureau of the Census, "Census and Geography-Concepts and Products," Factfinder CFF No. 8 (Washington, DC: U.S. Government Printing Office, August 1985).

1 The minimum population of these unincorporated areas, called census designated places, is lower in Alaska and Hawaii.

Table 1.--Urban and Rural Population by Size of Place (1980)

	Number of places	Population	Percent of U.S.
U.S. total	22,529	226,545,805	100.0%
Urban areas	8,765	167,050,992	73.7
Places of 1,000,000 or more	6	17,530,248	7.7
Places of 500,000-999,999	16	10,834,121	4.8
Places of 250,000-499,999	34	12,157,578	5.4
Places of 100,000-249,999	117	17,015,074	7.5
Places of 50,000-99,999	290	19,786,487	8.7
Places of 25,000-49,999	675	23,435,654	10.3
Places of 10,000-24,999	1,765	27,644,903	12.2
Places of 5,000-9,999	2,181	15,356,137	6.8
Places of 2,500-4,999	2,665	9,367,826	4.1
Places of less than 2,500	1,016	1,260,246	0.6
Other urban area[a]		12,662,718	5.6
Rural areas	13,764	59,494,813	26.3
Places of 1,000-2,499	4,434	7,037,840	3.1
Places under 1,000	9,330	3,863,470	1.7
Other rural area[b]		48,593,503	21.4

[a]Includes urban residents not living in Census-designated places.
[b]Includes rural residents not living in Census-designated places and residents of the rural portion of extended cities.

SOURCE: 1980 Census of Population, Volume 1, Characteristics of the Population, 1981, table 5, p. 1-37.

The 1980 Census identified 373 urbanized areas in the United States and Puerto Rico (52).[2]

The Census definition of urban areas has changed considerably over time. Prior to 1900, the lower population limit for the size of places considered urban was set at either 4,000 or 8,000. The limit was lowered to 2,500 residents in 1900 (47). This definition worked well until suburban development outside corporate boundaries became extensive. To improve the definition, people living in fairly densely populated areas (at least 1,000 persons per square mile) in the immediate vicinity of cities of 50,000 or more population were counted as urban instead of rural beginning in 1950 (21). With the exclusion of these suburban residents, the size of the 1950 rural population dropped from 62 million to 54 million (47).

The *rural population* has been divided by the Census Bureau into the farm and nonfarm populations. The *farm population* includes people living in rural areas on properties of 1 acre of land or more where $1,000 or more of agricultural products were sold (or would have been sold) during the previous 12 months.[3] In 1987, the farm population was

2 Since 1970, rural areas have been recognized within certain cities whose corporate limits include large areas lacking urban development. The rural portion of these "extended cities" is at least 5 square miles in area and has a population density of less than 100 persons per square mile. Together, such areas must constitute at least 25 percent of the land area of the legal city or include at least 25 square miles (50). In 1980 there were 87 extended cities with a total of 161,140 rural residents (41).

3 From 1960 to the mid 1970s, the farm population consisted of all persons living in rural territory on places of 10 or more acres, if at least $50 worth of agricultural products were sold from the place during the preceding 12 months. Persons living on places of under 10 acres were also included if agricultural sales totaled $250 or more (55).

Table 2.--Ten States With The Largest Rural Population (1980)

State	Rural population (in 1,000s)	Percent of State
Pennsylvania	3,643	30.7
North Carolina	3,059	52.0
Texas	2,896	20.4
Ohio	2,879	26.7
Michigan	2,711	29.3
New York	2,700	15.4
California	2,060	8.7
Georgia	2,054	37.6
Indiana	1,965	35.8
Illinois	1,908	16.7

SOURCE: U.S. Department of Commerce, Bureau of the Census, County and City Data Book: 1983 (Washington, DC: U.S. Government Printing Office, 1983).

estimated at 4,986,000, or about 8 percent of the rural population and 2 percent of the total resident U.S. population. In contrast, farm residents represented 30 percent of the population in 1920 (55).

According to the 1980 Census, 73.7 percent of the U.S. population was urban, but the proportion ranged from a low of 33.8 percent in Vermont to 100 percent in the District of Columbia (51). Table 1 shows the distribution of the 1980 urban and rural population by size of place. Over 85 percent of the rural population live in places or areas with fewer than 1,000 residents. Table 2 shows the ten States with the largest rural populations. Table 3 shows the seven States with more than one-half of their population residing in rural areas.

The Census Bureau's "urbanized" area concept does not apply to towns, cities, or population concentrations of less than 50,000. Those living nearby, but outside of the limits of smaller cities or towns are not counted as being part of an "urbanized" area, even though the "suburban" population may be large and economically integrated with the town. For example, the population surrounding the incorporated village of Hayward, Wisconsin (county seat of Sawyer County), exceeds the 1,456 population of Hayward. The residents of the surrounding area use Hayward's facilities such as a nursing home and fire station but are not included in the village population. This "undercount" has hampered the village's ability to obtain grants to improve area services (13). Numerous areas such as Hayward, that are considered "rural" by virtue of the fact that they are outside of an urbanized area and have a population of 2,500 or less, would be considered urban if the population immediately surrounding the corporate area were included. Many towns and villages have resolved this problem by annexing surrounding developed territory (12).

Table 3.--States With More Than One-Half of Their Population Residing in Rural Areas (1980)

State	Rural population (in 1,000s)	Percent of State
Vermont	339	66.2
West Virginia	1,244	63.8
South Dakota	370	53.6
Mississippi	1,328	52.7
Maine	591	52.5
North Carolina	3,059	52.0
North Dakota	334	51.2

SOURCE: U.S. Department of Commerce, Bureau of the Census, County and City Data Book: 1983, (Washington, DC: U.S. Government Printing Office, 1983).

The Office of Management and Budget: Metropolitan Statistical Areas

A *metropolitan statistical area* (MSA)[4] is an economically and socially integrated geographic unit centered on a large urban area. In general terms, an MSA includes a large population center and adjacent communities that have a high degree of economic and so-

4 From 1959 to 1983, MSAs were called Standard Metropolitan Statistical Areas (SMSAs) (53 FR 51175). The term MSA is used throughout this paper, even when referring to 1980 Census data.

cial integration with that center (54). This contrasts with Census' urban area, which is defined solely on the basis of where people reside (i.e., population size and density). MSAs are defined by OMB[5] and are used by Federal agencies for collecting, tabulating, and publishing statistical data. Some Federal agencies also use MSA designations to implement programs and allocate resources although OMB does not define them with such applications in mind. The business community uses MSA data and rankings extensively, for example to make investment decisions and to assess the desirability of markets (38).

The official standards that are used to define MSAs are reviewed prior to each decennial Census.[6] According to standards adopted for the 1980 Census, an MSA must have:[7]

- a city with 50,000 or more residents; or
- an urbanized area (as defined by the Census Bureau) with at least 50,000 people that is part of a county or counties that have at least 100,000 people.

In most areas, counties are the building blocks of MSAs. In the six New England States, MSAs are composed of cities and towns, rather than whole counties.[8] MSAs often include more than one county; i.e., one or more central counties containing the area's main population concentration and outlying counties that have close economic and social relationships with those central counties. To be included in the MSA, the outlying counties must have a specified level of commuting to the central counties and must also meet certain standards regarding metropolitan character, such as population density (see appendix A). Consolidated MSAs (CMSAs) are large metropolitan complexes within which individual components are defined, designated as primary MSAs (PMSAs) (see appendix A).

Problems in MSA classification may occur when county boundaries do not conform closely to actual urban or suburban development. An MSA may inappropriately include nonsuburban areas located in the outlying sections of some counties. For example, in a spatially large county with a concentrated metropolitan area, a large, sparsely populated area may be included in the MSA. This problem occurs more frequently in the West, where counties are bigger than those in the East. On the other hand, an MSA may exclude suburban areas just across the county line. For example, a county with a suburban population that commutes to a neighboring MSA may be excluded from that MSA because it also includes a large, sparsely populated section and therefore has a low average population density.[9] While these problems occur, they occur infrequently (56).

About three-quarters (76.6 percent) of the U.S. population lived in the 275 MSAs designated as of 1983.[10] These MSAs represent only 16.2 percent of the total U.S.

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5 The metropolitan area concept appeared in U.S. Census publications as early as 1910 but was not widely incorporated or used until the 1950 census when the concept was generalized to county lines (12,47).

6 The Office of Management and Budget's Statistical Policy Office, Office of Information and Regulatory Affairs, reviews and revises MSAs with advice from the interagency Federal Executive Committee on Metropolitan Statistical Areas (56).

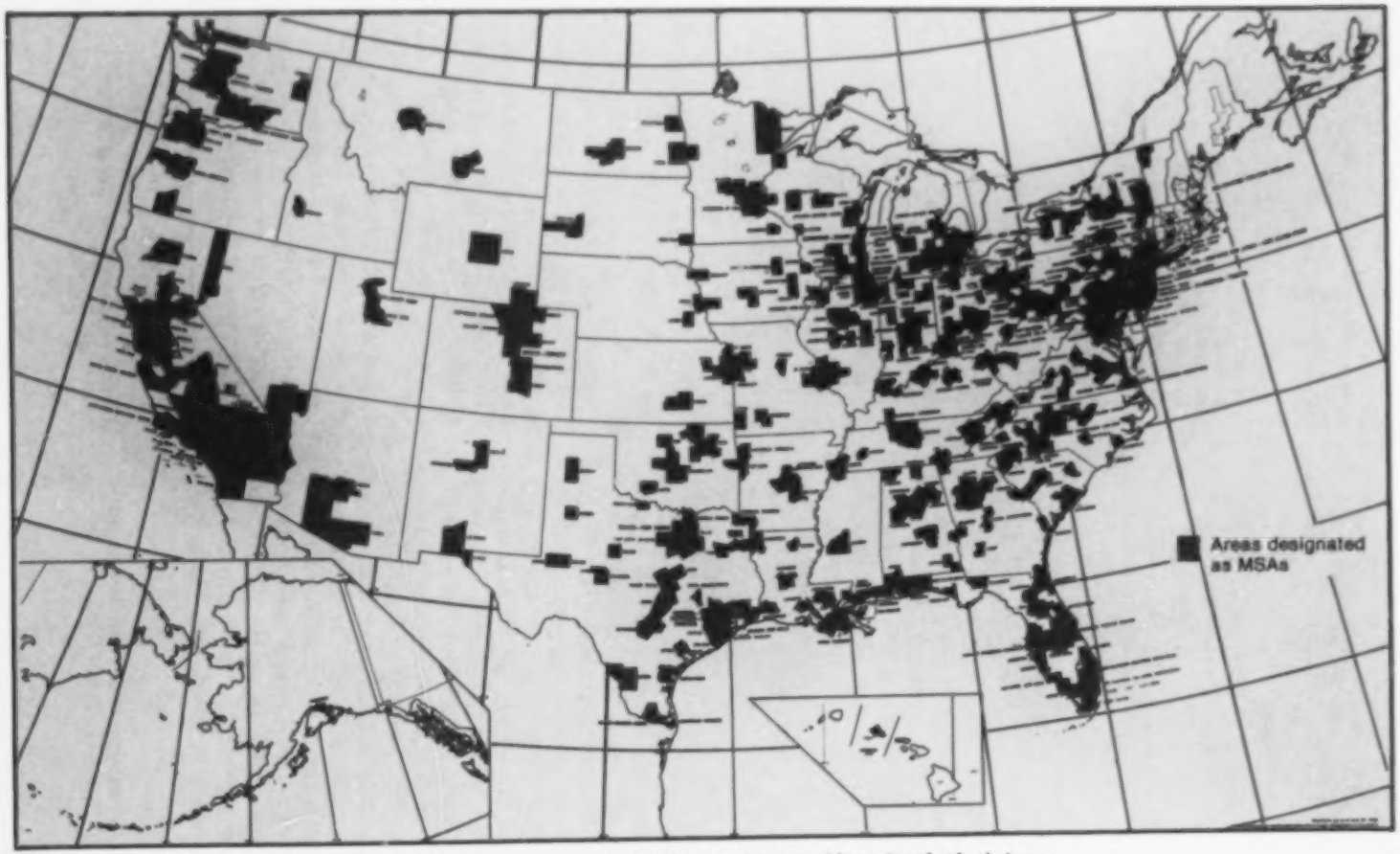
7 See appendix A for a summary of the 1980 MSA standards.

8 New England MSA standards are based primarily on population density and commuting patterns (56). The six New England States are Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

9 See appendix B for a description of criteria used in including outlying counties in an MSA.

10 By June 30, 1988, intercensal population estimates or special census population counts had been used to add seven newly qualified MSAs and to designate three new central cities within existing MSAs (12).

Figure 2.--Metropolitan Statistical Areas (June 30, 1986)



SOURCE: Adapted from U.S. Department of Commerce, Bureau of the Census, "Metropolitan Statistical Areas (CMSA's, PMSA's, and MSA's) (GE-50, No. 84) Stock No. 003-024-06506-1 (Washington, DC: U.S. Government Printing Office, 1986).

Table 4.--Ten States With The Largest Nonmetropolitan Population (1986)

State	Nonmetropolitan population (in 1,000s)	Percent of State
Texas	3,209	19.2
North Carolina	2,847	45.0
Ohio	2,277	21.2
Georgia	2,182	35.7
Illinois	2,033	17.6
Kentucky	2,033	54.5
Mississippi	1,837	70.0
Pennsylvania	1,830	15.4
Michigan	1,811	19.8
Indiana	1,760	32.0

SOURCE: U.S. Bureau of the Census, Statistical Abstract of the United States: 1988, 108th ed. (Washington, DC: 1987), table 33.

Table 5.--States With More Than One-Half of Their Population Residing in Nonmetropolitan Areas (1986)

State	Nonmetropolitan population (in 1,000s)	Percent of State
Idaho	809	80.7
Vermont	416	76.9
Montana	619	75.6
South Dakota	508	71.8
Wyoming	361	71.2
Mississippi	1,837	70.0
Maine	750	63.9
West Virginia	1,217	63.4
North Dakota	426	62.7
Arkansas	1,439	60.7
Iowa	1,629	57.1
Alaska	299	56.0
Kentucky	2,033	54.5
Nebraska	848	53.1
New Mexico	776	52.5

SOURCE: U.S. Bureau of the Census, Statistical Abstract of the United States: 1988, 108th ed. (Washington, DC: 1987), table 33.

land area (figure 2.--MSA map). Seventy-seven percent of U.S. counties (2,422 of 3,139 counties and county equivalents) are nonmetropolitan.[11] Table 4 shows the 10 States with the largest nonmetropolitan populations. Table 5 shows the 15 States with more than one-half of their population residing in nonmetropolitan areas.

Before 1970, an MSA's "recognized large population nucleus" had to include a central city of at least 50,000 population or twin cities with a total population this large. Now there is no minimum population size for an MSA's central city, and it is easier to include contiguous populations in the urbanized area (6). With the relaxation of MSA criteria, some of the 58 MSAs designated following the 1970 and 1980 censuses are demographically dissimilar from those MSAs meeting earlier standards. For example, of the 33 MSAs newly designated after the 1980 census that lacked a city of 50,000 or more residents, 25 had rural population percentages that were closer to nonmetropolitan norms (62 percent) than metropolitan norms (15 percent) (6). Furthermore, many of these do not have facilities and services traditionally associated with metropolitan areas, such as hospitals with comprehensive services, a 4-year college, a local bus service, a TV station, or a Sunday paper (6).

A few counties that have not qualified for MSA status on the basis of demographic characteristics have become designated as MSAs through the Federal legislative process. Specifically, since 1983, one new MSA (Decatur, Alabama) has been created (comprising two counties)[12] and the boundaries of two existing MSAs have been enlarged by statute (62).[13] The proponents of the bill to create the Decatur, Alabama MSA argued that "MSA status would encourage a measure of economic recovery to this area...without any additional financial burden on the Federal Government" (45). Hospitals located in the newly designated MSA of Decatur, Alabama are expected to receive an additional $3 million per year in Medicare reimbursements be-

11 There were 717 metropolitan counties (excluding New England) as of June 30, 1988 (12).

12 Public Law 100-258.

13 Public Law 100-202, Sec. 530 and Public Law 99-500.

cause of this change from nonmetropolitan (rural) to metropolitan status. The increase in Medicare outlays for these two counties would in aggregate decrease reimbursement to other hospitals because the total amount of funding for the Medicare program was not changed by this act (44).

The MSA definition is designed strictly for statistical applications and not as a general-purpose geographic framework. In fact, according to official standards, "no Federal department or agency should adopt these statistical definitions for a nonstatistical program unless the agency head has determined that this is an appropriate use of the classification" (56). The OMB does not take into account or attempt to anticipate any nonstatistical uses that may be made of the MSA definitions and will not modify the definitions to meet the requirements of any nonstatistical program (62). Nonetheless, Federal agencies often use MSA designations to implement their programs. Table 6 contains a partial list of Federal programs that use MSAs for the administration of programs or the distribution of funds.

Table 6.--Selected Federal Department/Agencies Using MSA Designations for the Administration of Programs or the Distribution of Funds[a]

Department of Agriculture
Farmers Home Administration
Rural Housing Assistance
Department of Education
Higher Education Assistance
Federal Impact Payments for Education
Summer Food Service Program
Department of Health and Human Services
Federal Grants for Residency Training
Aid to Organ Procurement Organizations
Medicare Prospective Payment System
Juvenile Delinquency Treatment Grants
Provision of Services to Medicare Beneficiaries by Health Maintenance Organizations (HMOs)
Department of Housing and Urban Development
Enterprise Zones
Public Housing Development
Community Development Block Grant Program
Urban Development Action Grants
Assisted Housing Fair Market Rents
Rental Rehabilitation Awards
Department of the Interior
Recreation Areas
Wastewater Treatment Works Grants
Department of Labor
Job Training Partnership Act

[a]Most MSA applications listed were identified by searching the U.S. Code and the Code of Federal Regulations (CFR) for the term "MSA." This list is not comprehensive.

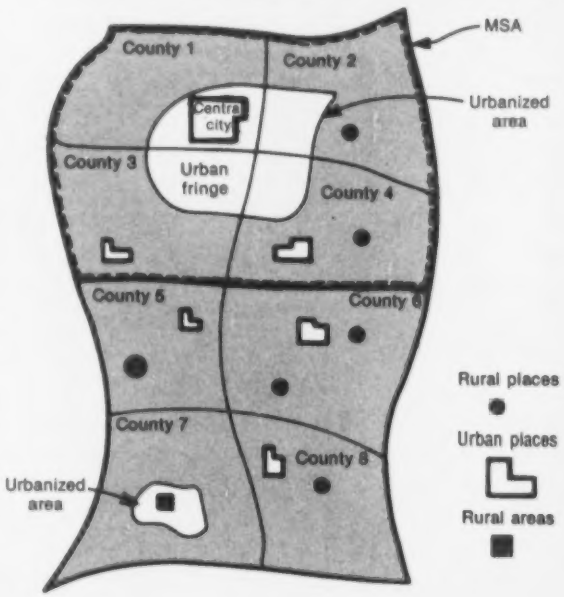
SOURCE: Bea, K., "Metropolitan Statistical Area Standards: Applications in Federal Policy," (CRS Draft), 1989; U.S. Department of Commerce, OFSPS, "Report on the Impact of Standard Metropolitan Statistical Areas on Federal Programs," 1978.

4. RELATIONSHIP BETWEEN URBAN/RURAL AND METROPOLITAN/NONMETROPOLITAN DESIGNATIONS

Conceptually, the urban/rural and metro/nonmetropolitan designations are quite different. Urban/rural are geographic designations based on population size and residential population densities, while the MSA concept embodies both a physical element (a city and its built-up suburbs) and a functional dimension (a more-or-less unified local labor market) (21). The Census-defined urban population and the MSA population intersect but are by no means identical; they are even less congruent geographically. Common to both are residents of most urbanized areas, the densely settled area that forms the nucleus of the MSA (see figure 3).[1] The Census' urban population includes the urbanized area population[2] and those living outside urbanized areas in places with 2,500 or more residents. The MSA population generally includes all those living in the county or counties that contain the urbanized area and the residents of additional counties that are economically integrated with that metropolitan core. Forty percent of the 1980 rural population lived in MSAs, and 14 percent of the MSA population lived in rural areas (see table 7). About one-fourth of farm residents live in MSAs (55).

"Rural area," "nonurbanized area," and "nonmetropolitan area" have all been used to display vital and health statistics or to implement Federal policies in health and other areas. These "rural" definitions can be analyzed in terms of how well they include "rural areas" and how well they exclude "urban areas." The Census-defined "rural area" is the most specific measure, since it excludes urbanized areas and places with 2,500 residents or more. Thus, few would argue that an area designated as rural according to the Census definition is really urban. However, some might argue that the Census definition would incorrectly classify as urban small towns which are located far from a large population center. In contrast, the "nonurbanized area" definition includes as rural all territory outside of its densely populated area, regardless of population size. Thus, while all "rural areas" would be included, some cities and towns of as large as 40,000 residents would also be included, as well as some outer suburbs of large urban areas.

Figure 3.--The Relationship Between Metropolitan Statistical Areas (MSAs), Urbanized Areas, and Urban and Rural Areas



Counties 1 through 4 comprise the MSA.

Urbanized areas form the nucleus of the MSA and can span two or more counties (e.g., counties 1 through 4). There are a few urbanized areas in non-MSA counties (e.g., county 7).

Urban areas include urbanized areas and places (e.g., cities and towns) with 2,500 or more residents. Such places are called urban places.

Rural places are located outside of urbanized areas and have fewer than 2,500 residents.

Rural areas are the residential territory (shaded gray) left after urbanized areas and urban places are excluded. The MSA has rural areas within it.

SOURCE: Office of Technology Assessment, 1989.

1 There are a few urbanized areas outside of MSAs.

2 A small number of rural residents of extended cities are excluded from the urban and urbanized area population.

Figure 4.--Map of California Counties: San Bernardino County

SOURCE: American Map Corporation, Business Control Atlas 1988 (Maspeth, New York: American Map Corporation, 1988).

The nonMSA designation falls in between the other two designations. If nonMSAs are used to define rural areas, some large towns and cities located outside of MSAs[3] would be included as rural while small towns and sparsely populated areas within MSAs would be excluded from the rural category. This exclusion is less a concern in the Eastern United States, where counties are relatively small,[4] and such towns would generally be expected to be relatively close to an urbanized area. However, in some of the large counties in the West, some areas within an MSA are far from an urbanized area (e.g., San Bernardino County--figure 4).

Table 7.--Population Inside and Outside of MSAs by Urban and Rural Residence (1980)

	Population	Percent of MSA/nonMSA
U.S. total	226,545,805	
Inside MSAs	**169,430,623**	100.0
Urban	145,442,528	85.8
Urbanized areas	137,481,718	81.1
Central cities	66,222,207	39.1
Urban fringe	71,259,511	42.1
Rural	23,988,095	14.2
Outside MSAs	**57,115,182**	100.0
Urban	21,608,464	37.8
Rural	35,506,718	62.2

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Volume 1, Characteristics of the Population, 1981, table 6, pp. 1-39.

3 There are at least 100 places with populations of 25,000 or more outside of MSAs.

4 A typical county in the East has a land area of 400 to 600 square miles. West of the Mississippi River there are great variations, but the average county land area is just over 1400 square miles excluding Alaska (29).

5. UNDERSTANDING DIVERSITY WITHIN RURAL AREAS: URBAN/RURAL TYPOLOGIES

Dichotomous measures of urbanity/rurality not only obscure important differences between urban and rural areas but also wide variations within rural areas. Consequently, there have been recommendations to implement a standard rural typology that would capture the elements of rural diversity and improve use and comparison of data (14). In the absence of such standardized data, it is difficult to quantify rural health problems and to make informed policy decisions.

In this section, several county-based rural/urban typologies or classification schemes are described that incorporate one or more of the following measures:

- population size and density;
- proximity to and relationship with urban areas;
- degree of urbanization; and
- principal economic activity.

Only county-based typologies are considered here, because the county is generally the smallest geographic unit for which data are available nationally. Counties also have several other characteristics that make them useful units of analysis: county boundaries are generally stable; counties can be aggregated up to the State level; and counties are important administrative units for health and other programs. For small-area analyses and for research purposes, ZIPCodes may be useful units of analysis. However, ZIPCodes boundaries are not stable and sometimes cross county lines.

Typologies Used To Describe Nonmetropolitan Areas

Several typologies have been developed to classify nonmetropolitan counties. Nine county-based typologies are described below.[1] These typologies are generally used for research purposes and have not yet been used by Federal agencies to implement health policies or to present vital and health statistics. Before discussing specific typologies, four geographic/demographic measures common to most of the typologies are briefly described: 1) population size, 2) population density, 3) adjacency to metropolitan area, and 4) urbanization.

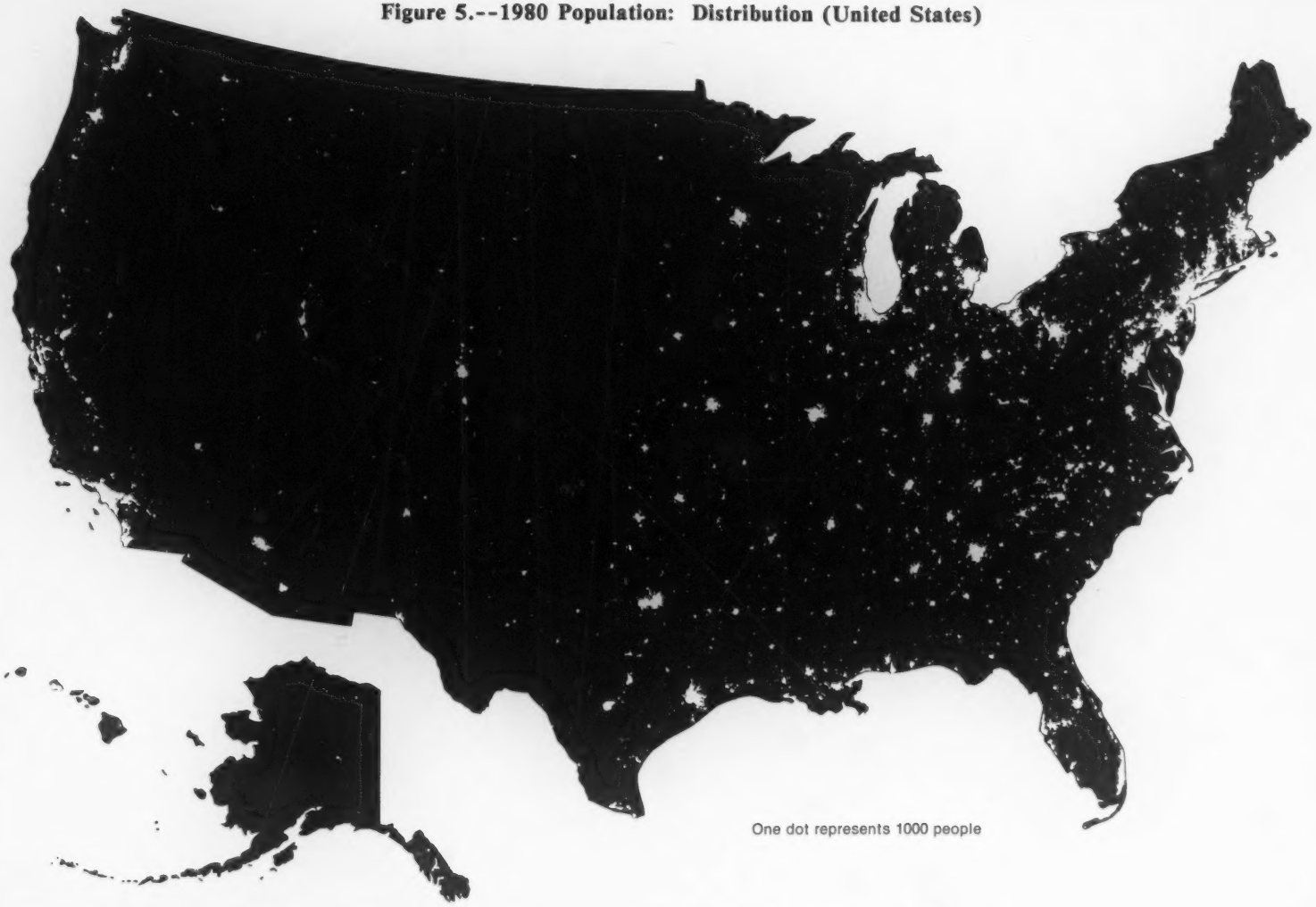
Population Size.--Population size can refer to the total population of the county or to the largest settlement in the county. Presentation of an area's population by settlement size helps to illustrate how the population is distributed. In 1980, 43 percent of the U.S. population lived in places of less than 10,000 population or the open countryside (see table 1). The Census Bureau's urban definition depends in part on population size (i.e., those living in places of 2,500 or more outside of urbanized areas).

Population Density.--Population density is calculated by dividing the resident population of a geographic unit by its land area measured in square miles or square kilometers. In 1980, half of the U.S. population (excluding Alaska and Hawaii) lived in counties with less than 383 persons per square mile (21). Population density ranges from 64,395 persons per square mile in New York County, New York (Manhattan) to 0.1 per square mile in Dillingham Census Division,[2] Alaska. Figure 5 shows how the U.S. population is distributed. Urbanized areas are defined primarily by population density (i.e., territory with at least 1,000 residents per square mile). One drawback of population density is that it doesn't describe how the population is distributed within an area. For example, a spatially large county that includes both small, densely settled urban areas and large, sparsely populated areas would have a population density that masks such extremes.

1 Not all rural typologies that have been proposed are described in this section. Excluded from discussion are several economic indices developed in the 1960s that associated economic underdevelopment with rurality.

2 There are no counties in Alaska. The county equivalents are the organized boroughs and "census areas" (U.S. Dept. of Commerce, 1980 Census of Population, Volume 1, 1981).

Figure 5.--1980 Population: Distribution (United States)



SOURCE: U.S. Department of Commerce, Bureau of the Census, "Population Distribution in the United States: 1980 (GE-70 No. 4) Washington, DC, 1984.

Adjacency to Metropolitan Area.--A county's adjacency to a metropolitan area can be measured geographically (e.g., sharing a boundary) or functionally (e.g., proportion of residents commuting to an MSA for work). Many residents of these adjacent counties, however, live some distance from an urban center, particularly in large counties in the West. Furthermore, natural geographic barriers or an absence of roads may impede access to metropolitan areas.

Urbanization.--Some typologies use various measures of the level of urbanization to differentiate nonmetropolitan counties. Sometimes, urbanization is measured by the absolute or relative size of the Census-defined urban population. For nonmetropolitan counties this generally means the population living in places with 2,500 or more residents or proportion of the county's population that is urban. In other typologies, an urbanized county is defined by the size of the county's total population (e.g., counties with 25,000 or more residents).

Urbanization/Adjacency to Metropolitan areas

Analysts at the U.S. Department of Agriculture (USDA) have classified nonmetropolitan counties on two dimensions: 1) the aggregate size of their urban population and 2) proximity/adjacency to metropolitan counties (see table 8) (22).[3] The urban population follows the Census Bureau's definition. Urbanized counties are distinguished from less urbanized counties by the size of the urban population (i.e., urbanized counties have at least 20,000 urban residents and less urbanized counties have 2,500 to 19,999 urban residents). A nonmetropolitan county's adjacency to an MSA is defined both by shared boundaries (i.e., touching an MSA at more than a single point) and by commuting patterns (i.e., at least 1 percent of the county's labor force commutes to the central county(ies) of the MSA).[4] Nearly 40 percent of the nonmetropolitan counties are adjacent to MSAs, and just over one-half of the nonmetropolitan population resides in these adjacent counties (see table 9).

Table 8.--Classification of Nonmetropolitan Counties by Urbanization and Proximity to Metropolitan Areas (2,490 counties as of 1970)[a]

Urbanized adjacent (173 counties)
- Counties with an urban population of at least 20,000 which are adjacent to a metropolitan county.

Urbanized nonadjacent (154 counties)
- Counties with an urban population of at least 20,000 which are not adjacent to a metropolitan county.

Less urbanized adjacent (565 counties)
- Counties with an urban population of 2,500 to 19,999 which are adjacent to a metropolitan county.

Less urbanized nonadjacent (734 counties)
- Counties with an urban population of 2,500 to 19,999 which are not adjacent to a metropolitan county.

Rural adjacent (241 counties)
- Counties with no places of 2,500 or more population which are adjacent to a metropolitan county.

Rural nonadjacent (623 counties)
- Counties with no places of 2,500 or more population which are not adjacent to a metropolitan county.

[a]Classification of nonmetropolitan areas using 1980 Census data is forthcoming from the Department of Agriculture (McGranahan, personal communication, 1989).

SOURCE: McGranahan et al., 1986, "Social and Economic Characteristics of the Population in Metro and Nonmetro Counties, 1970-1980."

3 This classification also includes three types of metropolitan counties based on MSA total population--small (under 250,000 population), medium (250,000 to 999,999), and large (1 million or more).

4 The classification scheme was introduced in 1975 by Hines, Brown, and Zimmer of USDA. Calvin Beale and David Brown, also at USDA, later modified the classification to include the 1 percent commuting requirement for adjacent counties (13). A 2 percent commuting level is used in a more recent version of the typology (5).

This typology still masks differences among nonMSA counties. For example, both a county with one town of 20,000 and a county with eight towns of 2,500 would be considered urbanized under this typology. The county with several small towns is unlikely to have the level of services of a county with its population concentrated into larger towns.

Adjacency to Metropolitan Areas/Largest Settlement Size

Another county typology groups nonmetropolitan counties by adjacency to MSAs and by size of the largest settlement (21) (table 10). Size of largest settlement is a useful parameter to include when analyzing health services since large settlements are more likely to have hospitals and specialized health care providers. However, the presence of a large town or city does not guarantee easy access to facilities for all residents of a spatially large county.

Population Density: Incorporation of the Frontier Concept

The National Rural Health Association (NRHA) has proposed a classification system that includes four types of rural areas (27):

- adjacent rural areas--counties contiguous to or within MSAs which are very similar to their urban neighbors;
- urbanized rural areas--counties with 25,000 or more residents but distant from an MSA;
- frontier areas--counties with population densities of less than 6 persons per square mile, which are the most remote areas;

Table 9.--Nonmetropolitan County Population Distribution by Degree of Urbanization and Adjacency to an MSA (1980)

	Population[a] (1,000s)	Percent[b] of nonMSA
U.S. total	226,546	
MSA counties	163,526	
NonMSA counties	63,020	100.0%
Urbanized		
Adjacent to MSA	14,802	23.5
Not adjacent to MSA	9,594	15.2
Less urbanized		
Adjacent to MSA	15,350	24.4
Not adjacent to MSA	15,529	24.6
Totally rural		
Adjacent to MSA	2,737	4.3
Not adjacent to MSA	5,008	7.9

[a]Total MSA/nonMSA populations differ from those in table 7 because this typology relies on 1970 MSA designations.

[b]Percent does not sum to 100 due to rounding.

SOURCE: D.A., McGranahan, et al., "Social and Economic Characteristics of the Population in Metro and Nonmetro Counties, 1970-1980."

Table 10.--U.S. Population by County's Largest Settlement and Adjacency to an MSA (1980)

	Population (1,000s)	Percent of U.S.
U.S. total	226,505	100.0
NonMSA counties	60,512	26.7
Counties not adjacent to an MSA		
Largest settlement		
Under 2,500	4,543	2.0
2,500 to 9,999	10,255	4.5
10,000 to 24,999	7,120	3.1
25,000 or more	4,124	1.8
Counties adjacent to an MSA		
Largest settlement		
Under 2,500	3,157	1.4
2,500 to 9,999	13,236	5.8
10,000 to 24,999	12,467	5.5
25,000 or more	5,610	2.5
MSA counties	165,994	73.3
Largest settlement		
Under 100,000	3,611	1.6
100,000 to 249,999	18,461	8.2
250,000 to 499,999	24,883	11.0
500,000 to 999,999	28,640	12.6
1,000,000 to 2,999,999	50,524	22.3
3,000,000 or more	39,875	17.6

SOURCE: Adapted from L., Long, and D., DeAre, "Repopulating the Countryside: A 1980 Census Trend," Science, vol. 217, Sept. 17, 1982, pp. 111-116.

- countryside rural areas--the remainder of the country not covered by other rural designations.

This typology includes some important concepts not covered by other typologies, such as the concept of the "frontier" area. This typology also differs from other typologies because it includes some counties within MSAs (i.e., in the adjacent rural area category). Since the categories are not mutually exclusive, however, some counties will fall into more than one group. For example, under this typology 3 of 14 counties in Arizona would be both "urbanized rural areas" and "frontier areas" because the counties' populations exceed 25,000 residents and the population density is less than 6 persons per square mile.[5] County population size is a poor indicator in the West because many counties there are much larger than elsewhere.

Urbanization/Population Density

Two other rural typologies incorporate population density and urbanization. The first is a classification developed by Bluestone[6] and the second is a modification by Clifton of that classification (see table 11).[7] Urbanization is defined in terms of the proportion of the county that is urban (i.e., lives in towns of 2,500 or more). An advantage of using the percent of a county's population that is urban is that it is not influenced much by the size of the county, or by a county's including a large stretch of unpopulated territory. Density is heavily affected by these conditions. Combining measures of urbanization and density provides some indication of the degree of population concentration or dispersion. However, as with the USDA typology, a county with one town of 20,000 and a county with eight towns of 2,500 may not be distinguished under this scheme.

Table 11.--Bluestone and Clifton County Classifications Based on Urbanization and Population Density

	Percent urban	Population per square mile
Bluestone classification		
Metropolitan	GT 85 percent	GT 100
	or GT 50 percent	or GT 500
Urban	LT 85 percent	100-500
Semi-isolated urban	GT 50 percent	LT 100
Densely settled rural	LT 50 percent	50-100
Sparsely settled rural with some urban population	LT 50 percent	LT 50
Sparsely settled rural with no urban population	0 percent	LT 50
Clifton's classification		
Urban	GE 50 percent	GE 200
Semi-urban	GE 50 percent	30-200
Densely settled rural	LT 50 percent	GT 30
Rural	LT 100	LT 30

ABBREVIATIONS: GT=greater than; GE=greater than or equal to; LT=less than.

SOURCE: B., Sinclair, and L., Manderscheid, "A Comparative Evaluation of Indexes of Rurality--Their Policy Implications and Distributional Impacts," contract report, Department of Agricultural Economics.

Distance From an MSA or Population Center

Two rural indexes[8] are based on distance from an MSA or population center. Hathaway et al., developed a size-distance index that

5 The three Arizona counties are Apache, Coconino, and Mohave.

6 Herman Bluestone, "Focus for Area Development Analysis: Urban Orientation of Counties," Economic Development Division, Economic Research Service, USDA as cited in Sinclair and Manderscheid.

7 Ivery Clifton, Agricultural Economist, Economic Research Service, USDA, unpublished manuscript as cited by Sinclair and Manderscheid.

8 These rural indexes are different from typologies in that they are continuous (e.g., a scale from 1 to 100) rather than categorical measures.

includes two measures: miles from an MSA and the population of that MSA (39). Smith and Parvin considered three county characteristics in their rural index: population-proximity; population density; and employment in agriculture, forestry, or fisheries (40,43). A county's population-proximity indicates the relative access to adjacent counties' populations.

Population-proximity is measured as the county population plus the size-distance ratio of surrounding counties.[9] To illustrate, the population-proximity for County A of size 20,000 surrounded by four counties B through E is as follows:

Table 12.--Population-Proximity: A Measure of a County's Relative Access to Adjacent Counties' Populations

County	Distance between County A and the indicated county population	Ratio of population to distance (miles)[a]	(pop./mile)
A	20,000	0	0
B	15,000	30	500
C	60,000	40	1,500
D	250,000	100	2,500
E	100,000	10	10,000
	Sum of ratios.....		14,500
	Add population of County A.....		20,000
	Population-proximity for County A.....		34,500

[a]Distance is the number of miles between the county seat of County A and the county seat of the indicated county.

SOURCE: Adapted from Select Committee on Aging, 1983 "Status of the Rural Elderly."

The combination of distance to adjacent population centers and size of that population in a typology is attractive because distance is a good access indicator and population size indicates service availability. The typologies incorporating these measures may be most informative for geographically small counties. For large counties, however, the distance from one county seat to the next is unlikely to be applicable to those living at a distance from the county seat.

Commuting-Employment Patterns

A relatively new county classification system incorporates measures of population size, urbanization, commuting patterns of workers, and the relationships between workplace and place of residence (28). The classification criteria are shown in table 13 and the distribution of U.S. counties according to this typology is shown in table 14. The inclusion of employment and commuting measures may allow this typology to identify groups of counties that are economically related such as service and labor market areas.

Economic and Socio-Demographic Characteristics

Nonmetropolitan counties have also been classified according to their major economic bases, land uses, or population characteristics (table 15) (7).[10] Fifteen percent of nonmetropolitan counties (370 of 2,443 counties in the 48 conterminous States) remain unclassified using this approach. Among the counties that are classified, 70 percent fall into only one of the seven categories; the remaining 30 percent fall into two or more categories (37).

Some of the data used to develop this classification are now a decade old (e.g., farm employment), and it is likely that with continued diversification of the rural economy

9 The population-proximity is "the sum of the total population in the reference county and the sum of the ratios of the number of persons in all counties within 125 miles of the reference county divided by the distance in miles between the county seat in the reference county and the county seat in each county within the specified distance (43)."

10 These represent the nonmetropolitan counties as defined in 1974.

Table 13.--County Typology Based on Employment, Commuting, and Population Characteristics

Key to Nonmetropolitan Types

County type	E/R ratio[a]	Percent of workers working outside county	Urban population	Percent of population that is urban	Total population
Nonmetro centers	(a) .98 or higher OR		(Place or cluster) 10,000 or more	25% or more	25,000 or more
	(b) .85 or higher	less than 30%	(Place or cluster) 10,000 or more		10,000 or more
Nonmetro satellites Does not qualify for nonmetro center AND	.70 or higher	less than 30% and at least 15%	5,000 or more		10,000 or more
Nonmetro commuting with center Would qualify for nonmetro center, nonmetro satellite or nonmetro small center but has more outcommuting		30% or more			
Nonmetro small centers Does not qualify for nonmetro center, nonmetro satellite or nonmetro commutting with center AND	(a) 1.20 or higher OR	less than 30%			2,000 or more
	(b) .98 or higher OR	less than 30%	2,000 or more		
	(c) between .85 and .97 inclusive	less than 30%	If less than 3,500 must have ——→	20% or higher	
Rural commuting counties Does not qualify for nonmetro center, nonmetro satellite or nonmetro small center, but has more outcommuting than nonmetro rural.		30% or more			
Nonmetro rural counties Does not qualify for any of the other nonmetro categories					

Key to Metropolitan Types

County type	E/R ratio	Percent of workers working outside county
Metro centers	0.98 or higher	less than 30%
Metro satellites	between 0.70 and 0.97, inclusive	less than 30%
Metro commuting satellites	0.70 or higher	30% or more
Metro suburban	between 0.50 and 0.69, inclusive	
Metro dormitory	lower than 0.50	

[a]E/R ratio represents the number of workers working in the county divided by the number of workers residing in the county.

SOURCE: J. Pickard, "A New County Classification System," Appalachia 2:(3), summer 1988, pp. 19-24.

Table 14.--Distribution of U.S. Counties by Typology Based on Employment, Commuting, and Population Characteristics (1986)

	Number of counties	Percent of U.S.
Nonmetropolitan county types	2393	23.2
Centers	543	11.1
Satellites	212	2.4
Commuting counties with center	239	2.7
Small centers	565	3.7
Rural commuting counties	333	1.7
Rural counties	501	1.6
Metropolitan county type	745	76.8
Metro centers	295	44.7
Metro satellites	91	10.0
Metro commuting satellites	193	15.0
Metro suburban	133	6.6
Metro dormitory	33	less than 1

SOURCE: J., Pickard, "An Economic Development County Classification for the United States and its Appalachian County Types," Appalachian Regional Commission, Washington, DC June 1988.

since the late 1970s, even fewer counties[11] would be classified into one of these groups. On the other hand, many rural economies remain small and dependent on a single industry or occupation despite the economic diversification (7).

Conclusion

In summary, several typologies for nonmetropolitan counties have been developed incorporating measures of population size and density, urbanization, adjacency and relationship to MSA, and principal economic activity (see table 16). While it is desirable to have a standardized typology to portray the diversity of rural areas, the potential uses of typologies are varied and require inclusion of different measures. For example, to study the geographic variation of access to health care, a typology that includes population size, density, and distance to large settlements is of interest. To study health personnel labor market areas, however, a typology based on economic areas, market areas, or worker commuting patterns is preferable. On the other hand, rural economists or sociologists may be more interested in identifying counties with economies dependent on farming, mining, or forestry.

While no one typology meets all potential needs, there are several desirable features of any typology. For example, for many purposes it is helpful to have typologies with mutually exclusive (i.e., nonoverlapping) categories. The National Rural Health Association's typology includes frontier (less than 6 persons per square mile) and urbanized rural counties (population of 25,000 or more and not adjacent to an MSA). Yet it is possible for counties to meet both criteria.

The concept of urbanization is incorporated into several of the typologies. In some cases, urbanization is determined by the absolute or relative size of a county's urban population and in others, by the size of a county's largest settlement. When the size of the urban population is used, a county with one large city with the balance of the county sparsely populated, would be indistinguishable from a county with several smaller towns. As level of resources are likely to be city-size dependent, typologies using this measure of urbanization may not discriminate well for some applications. On the other hand, while largest settlement size might be indicative of level of services available in the county, it is not informative of how remote those services might be for all county residents. In geographically small counties, large settlements are likely to be accessible to all county residents. In the West, however, counties can be as large as some Eastern States, and some measure of proximity would be useful to indicate physical access. Measures of how

11 If the classification scheme were updated, the proportion of nonmetropolitan counties either not classified or falling into more than one group would likely be greater than the present 43 percent.

Table 15.--Classification of Nonmetropolitan Counties by Economic and Socio-Demographic Characteristics[a]

- **Farming-dependent counties**
  702 counties concentrated largely in the Plains portion of the North Central region.
  Farming contributed a weighted annual average of 20 percent or more of total labor and proprietor income over the five years from 1975 to 1979.
- **Manufacturing-dependent counties**
  678 counties concentrated in the Southeast.
  Manufacturing contributed 30 percent or more of total labor and proprietor income in 1979.
- **Mining-dependent counties**
  200 counties concentrated in the West and in Appalachia.
  Mining contributed 20 percent or more to total labor and proprietor income in 1979.
- **Specialized government counties**
  315 counties scattered throughout the country.
  Government activities contributed 25 percent or more to total labor and proprietor income in 1979.
- **Persistent poverty counties**
  242 counties concentrated in the South, especially along the Mississippi Delta and in parts of Appalachia.
  Per capita family income in the county was in the lowest quintile in each of the years 1950, 1959, 1969, and 1979.
- **Federal lands counties**
  247 counties concentrated in the West.
  Federal land was 33 percent or more of the land area in a county in 1977.
- **Destination retirement counties**
  515 counties concentrated in several northern Lake States as well as in the South and Southwest.
  For the 1970 to 1980 period, net immigration rates of people aged 60 and over were 15 percent or more of the expected 1980 population aged 60 and over. Retirement counties are disproportionately affected by entitlement programs benefiting the aged.

[a]The number of nonmetropolitan counties does not add to the total number (2,443), because the categories are not mutually exclusive and 370 counties do not fit any of the categories.

SOURCE: Bender, L.D., Green, B.L., Hady, T.F., et al., Economic Research Service, U.S. Department of Agriculture, The Diverse Social and Economic Structure of Nonmetropolitan America, Rural Development Research Report No. 49 (Washington, DC: U.S. Government Printing Office, September 1985).

Table 16.--Features of the Nine County-Based Typologies

	Measures					
Typology	Population size	Density	Urbanization	Adjacency	Distance	Economy
USDA-1[a]	..	..	■	■	..	..
Long and DeAre[b]	■	..	..	■	..	..
NRHA[c]	■	■	..	■	..	..
Bluestone[d]	..	■	■	..	..	..
Clifton[e]	..	■	■	..	..	..
Parvin and Smith[f]	■	..	..	..	■	..
Hathaway[g]	■	..	..	..	■	..
Pickard[h]	■	..	■	..	..	■
USDA-2[i]	..	..	..	..	..	■

[a]McGranahan, D.A. et al., USDA, 1986.
[b]Long, L. and DeAre, D., 1982.
[c]National Rural Health Association, as cited in Patton, L., 1989.
[d]Bluestone, H. as cited in Sinclair, B., and Manderscheid, L.V., 1974.
[e]Clifton, I. as cited in Sinclair, B., and Manderscheid, L.V., 1974.
[f]Parvin, D.W. and Smith, B.J. as cited in U.S Congress, House of Representatives, Task on the Rural Eldelry of the Select Committee on Aging, 1983.
[g]Hathaway, D.E. as cited in Sinclair, B., and Manderscheid, L.V., 1974.
[h]Pickard, J., Appalachia 21(3):19-24, Summer, 1988.
[i]Bender, L.D. et al., USDA, 1985.

SOURCE: Office of Technology Assessment, 1989.

evenly the population is distributed might also be useful for large counties.[12] Several of the typologies incorporate an adjacent-to-MSA measure, which is an indicator of access to level of services. The proportion of a county's population that is urban is a useful measure in large Western counties because unlike population density, it is a measure that is not influenced much by size of county or by population distribution.

Nonmetropolitan county data can also be disaggregated regionally by State or groups of States (e.g., the four Census regions or nine Census divisions), or by economic areas (e.g., Bureau of Economic Analysis Areas or BEAs). The Bureau of the Census defines "county groups" that are usually contiguous counties that combined have a population of 100,000 or more.[13] These counties are generally grouped according to meaningful State regions such as planning districts (50).

A new category of nonmetropolitan area called "micropolitan area" has recently been described (42a). While not a typology, the new category does distinguish nonmetropolitan areas that exert similar social and economic influences on their regions as metropolitan areas do on a larger scale. Most micropolitan areas are single counties but a few span two counties or are independent cities. Micropolitan counties are relatively large (40,000 or more residents) and include a central "core city" with at least 15,000 residents.[14,15] Many micropolitan areas are college towns, sites of military bases, and retirement areas. More than 15 million people or about one-quarter of nonmetropolitan residents live in the 219 identified micropolitan[16] areas.

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12 The Hoover index is a measure of population concentration or dispersion. The index ranges from zero, which indicates a perfectly uniform distribution in which each subarea has the same proportion of total population as it does of land area, to 100, which represents the concentration of all the population into a single subarea (21). To estimate county population dispersion, subcounty geographic areas would be used. Other methods to measure population concentration or dispersion include the nearest-neighbor statistic or the quadrant technique, but both require a geographic information system incorporating longitude and latitude measures (9,17,24).

13 These county groups are only defined in public use data files.

14 If a nonmetropolitan city of 15,000 or more residents has at least 40 percent of its population in each of two counties, the micropolitan area includes both counties.

15 In four States (Maryland, Missouri, Nevada, and Virginia) some cities (called independent cities) have the same status as counties and are considered micropolitan if they have 15,000 or more residents and are larger than 15 square miles. If the city is areally smaller, it is joined with the adjacent county to form the area.

16 A list of micropolitan areas is available from Niagara Concepts, P.O. Box 296, Tonawanda, New York 14151-0296.

6. THE AVAILABILITY OF VITAL AND HEALTH STATISTICS FOR NONMETROPOLITAN AREAS

Given the diversity of nonmetropolitan areas, it is important to present vital and health and statistics by State, region, or by nonmetropolitan typology. Data from the decennial Census and national vital statistics (e.g., natality and mortality data) are published for nonmetropolitan areas by State and degree of urbanization, but few other sources of health information are published along these dimensions. For example, the National Center for Health Statistics does not publish detailed nonmetropolitan data (e.g., cross-tabulated by Federal region) in their reports on National Health Interview and National Medical Care Utilization and Expenditure Surveys. Sometimes, limitations of the way in which the data are collected (e.g., the sample size or frame) limit the extent to which nonmetropolitan data can be displayed. In general, however, survey data files are available for public use and can be analyzed by area.

The choice of definition of "rural" used to present demographic and health data can make a substantive difference. For example, whether a disproportionate number of rural residents are elderly depends on how rural is defined. Table 17 shows the proportion of the population aged 65 and older according to metro/nonmetropolitan and urban/rural designations. The elderly appear to make up a larger proportion of the total population in nonmetropolitan than metropolitan areas (13.0 v. 10.7 percent). Using the urban/rural categories, however, the opposite is true--there is a greater proportion of elderly residents in urban than rural areas (11.4 v. 10.9). The explanation of this discrepancy appears to be that there are proportionately more persons 65 and older living in urban nonmetropolitan areas (14.3 percent) and fewer in rural metropolitan areas (9.0 percent). Moreover, when nonmetropolitan county MSA-adjacency and size of the urbanized population are considered, the aged appear to be over-represented in the less urbanized and non-adjacent counties (see table 18).

Table 17.--Proportion of the Population 65 and Older by Metropolitan/Nonmetropolitan and Urban/Rural Residence

Area	U.S. population	Percent age 65 and over
Metropolitan	169,430,577	10.7
Nonmetropolitan	57,115,228	13.0
Urban	167,054,638	11.4
Rural	59,491,167	10.9
Metropolitan		
Urban	145,451,315	10.9
Central cities	67,854,918	11.8
Not central cities	77,596,397	10.2
Rural	23,979,262	9.0
Nonmetropolitan		
Urban	21,603,323	14.3
Rural	35,511,905	12.2

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1980 Census: General Social and Economic Characteristics.

Table 18.--Proportion of Nonmetropolitan Population Age 65 and Older by Level of Urbanization and Adjacency to an MSA[a] (1980)[b]

	U.S. Population (1,000s)	Percent age 65 and older
U.S. total	226,546	11.2
Metropolitan counties	163,526	10.7
Nonmetropolitan counties	63,020	12.8
Urbanized		
Adjacent to metro area	14,802	11.9
Not adjacent	9,594	11.0
Less urbanized		
Adjacent to metro area	15,350	13.3
Not adjacent	15,529	13.5
Totally rural		
Adjacent to metro area	2,737	13.7
Not adjacent	5,008	14.6

[a]Urbanized counties are those with an urban population of at least 20,000; less urbanized counties are those with an urban population of between 2,500 to 19,999; and totally rural counties are those with no populations of 2,500 or more.

[b]1980 Census information is displayed using the 1970 classification of counties.

SOURCE: D.A., McGranahan, et al., "Social and Economic Characteristics of the Population in Metro and Nonmetro Counties, 1970-80," USDA, ERS, Rural Development Research report 58, appendix, table 2.

Infant mortality is also better understood by looking beyond metropolitan/nonmetropolitan comparisons. Department of Health and Human Services (DHHS) publishes data on infant mortality for urban and "not urban" places within metropolitan and nonmetropolitan counties (nonmetropolitan urban places are defined as those with populations of 10,000 or more).[1] Table 19 shows that within U.S. nonmetropolitan areas (1985-1986), white infant mortality rates were *lower* in nonurban places than in urban places (9.3 versus 9.9). Black infant mortality, in contrast, is *higher* in non urban places (17.8 versus 16.5). In some nonmetropolitan areas (e.g., Alabama), infant mortality is higher in the more rural areas for both whites and blacks (see table 19).

Table 19.--Nonmetropolitan Infant Mortality Rates by Urban Area and Race, U.S. Total and Alabama (1986)

	Infant mortality rate (no. deaths) (deaths under age 1 per 1,000 births)			
	United States		Alabama	
Nonmetropolitan	10.4	(17,926)	12.7	(553)
Urban places[a]	10.8	(4,075)	10.9	(115)
White	9.9	(3,019)	7.4	(47)
Black	16.5	(958)	16.3	(67)
Other	7.1	(98)	7.6	(1)
Balance of area	10.3	(13,851)	13.3	(438)
White	9.3	(10,644)	10.5	(228)
Black	17.8	(2,632)	19.2	(210)
Other	10.7	(575)	--	(0)

[a]Urban places in nonMSA counties are those with populations of 10,000 or more.

SOURCE: Department of Health and Human Services, Public Health Service, Vital Statistics of the U.S.: 1986, 1985, Vol. 1, Natality, Pub. No. 88-1123, 88-1113 (Washington, DC: U.S. Government Printing Office, 1988, 1987); 1986, 1985, Vol. 2, Mortality, Pub. No. 88-1114, 88-1102 (Washington, DC: U.S. Government Printing Office, 1988, 1987).

In summary, quite different conclusions about the rural population may be reached by changing the definition of rural areas. Furthermore, important within-area variations are obscured when national data are not published for sub nonmetropolitan areas.

The problem of limited rural data is not a new one for policymakers. In 1981, the National Academy of Sciences addressed the issue in a report, *Rural America in Passage: Statistics for Policy*. A panel on Statistics for Rural Development Policy comprised of agricultural economists, statisticians, geographers, sociologists, and demographers made a number of recommendations to improve the perceived poor availability and quality of rural statistical databases. The panel recommended that the Federal Government "take a more active role in the coordination of statistical activities and in developing and promulgating common definitions and other statistical standards that are appropriate for implementation at the Federal, State, and local levels." The panel concluded that a single definition of "rural" is neither feasible nor desirable but recommended that data be organized in a building-block approach so that different definitions and typologies could be constructed. The panel recognized the need for a common aggregation scheme for counties. It recommended the development of a standard classification of nonmetropolitan counties related to the level of urbanization. The panel recommended that if possible, the county classification should be supplemented by a distinction between urban and rural areas within counties (13).

The lack of consistent county coding poses difficulties for those interested in developing county-based definitions and typologies. Unique county identifiers called county FIPS (Federal Information Processing Standards) codes are provided by the National Institute of Measurement and Technology[2]

1 DHHS defines urban places in MSA counties as those with populations of 10,000 or more but less than 50,000. This urban definition differs from the Bureau of the Census definitions of urban or urbanized areas.

2 The National Institute of Measurement and Technology was formerly the Bureau of National Standards.

but are not universally used (8). The panel recommended that Federal and State data be recorded with such county codes to permit tabulations for individual counties and groups of counties. Adherence to a county coding system would facilitate aggregation of information regardless of how rural is defined. Since the report was issued in 1981, few of its recommendations have been implemented (8).

The relative merits of the county-based typologies for health service planning and research can be evaluated using the Area Resource File (ARF), a county-level data base maintained by the Health Resources and Services Administration (61). The file contains data necessary for the Bureau of Health Professions to carry out its mandated program of research and analysis of the geographic distribution and supply of health personnel. Population, economic, and mortality data, and measures of health personnel, health education, and hospital resources, are included in the file (61).

The ARF has been used to show how the availability of physician and hospital resources varies by type of nonmetropolitan area (table 20) (18). For example, when physician availability is examined by type-of-county, wide variations in physician-to-population ratios are evident. The average physician-to-population ratio is 64 per 100,000 in nonmetropolitan counties[3] but it ranges from 131 per 100,000 in high-density counties to a low of 45 per 100,000 in persistent poverty counties (see table 20). Somewhat surprisingly, there appear to be relatively more physicians in nonadjacent than adjacent nonmetropolitan counties (67 compared to 59 per 100,000). A possible explanation is that physicians serving many of the residents of the adjacent nonmetropolitan counties are preferentially locating in the outlying suburban areas of MSAs.

Maps effectively illustrate geographic variation in health status and access to health care resources. U.S. cancer atlases have been published at the county level providing a visualization of geographic patterns of cancer mortality not apparent from tabular data (60).[4] Rural women in the lower socioeconomic classes have high rates of cervical cancer and for white women, maps show concentrations of cervical cancer throughout the South, especially in Appalachia (see figure 6).

Maps of the United States by county show higher death rates due to unintentional injury (e.g., housefires and drownings) and motor vehicle crashes in rural areas, particularly in Western, sparsely populated counties (see figures 7-8). The large volume of travel on major routes traversing rural areas does not account for the high rural death rates. Instead, road characteristics, travel speeds, seat-belt use, types of vehicles, and availability of emergency care are factors that may contribute to the excess of motor vehicle crash deaths in rural areas (3).

Maps of nonmetropolitan county variation in health indicators (e.g., infant mortality) and the distribution of health care resources (e.g., physicians, hospitals) will soon be published in the *Rural Health Atlas*.[5] A typology of rural medical care is being developed for the Atlas, which incorporates measures of access to primary care physicians and health facilities. Such a typology will help identify isolated communities with limited access to health care (35).

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3 This analysis was limited to nonmetropolitan counties of less than 50,000 population in 1985. Only physicians engaged in patient care are included.

4 The U.S. Cancer Atlas maps cancer mortality by county groupings called State Economic Areas (SEA). 506 SEAs were delineated by the Bureau of the Census in 1960. SEAs are geographic units with similar demographic, climatic, physiographic, and cultural features (60).

5 The atlas is scheduled to be published by researchers at the University of North Carolina by October, 1989 (35).

Table 20.--Characteristics of Different Categories of U.S. Nonmetropolitan Counties (2,092 nonmetropolitan counties of less than 50,000 population in 1985)[a]

Category (number of counties)	1985 M.D.+ DO/100,000	1986 hospital beds/1,000	1986 hospital days per 1,000	1980 Age over 65	1979 % in poverty
U.S. total (2092)	64.2	5.0	962	14.2	17.6
Urbanized (83)	113.7	6.4	1421	12.5	15.2
Less urban (1239)	71.9	5.5	1081	13.9	16.7
Rural (770)	46.5	4.1	721	15.1	19.3
MSA adjacent (751)	58.6	4.3	858	13.9	16.4
MSA nonadjacent (1341)	67.3	5.4	1021	14.8	18.2
1980 population density					
3 or less (194)	48.9	4.9	838	13.1	17.9
>3 and ≤6 (181)	59.2	7.2	1382	14.7	16.5
>6 and ≤9 (123)	63.4	6.1	1035	15.9	16.1
>9 and ≤50 (1235)	60.5	4.6	858	14.8	18.5
>50 and ≤100 (320)	80.5	4.9	1053	12.5	15.7
more than 100 (39)	130.5	7.7	1959	11.4	12.0
East (59)	115.7	5.5	1443	13.5	12.8
South Atlantic (324)	60.7	4.2	866	12.7	20.7
South (624)	54.4	4.3	680	14.8	22.0
Central (799)	64.9	5.9	1193	16.0	14.3
West (286)	75.4	5.1	942	11.5	14.3
Agricultural only (464)	52.2	5.7	1011	16.6	17.1
Agricultural total (680)	49.1	5.1	944	15.9	18.8
Manufacturing only (290)	68.3	4.5	847	13.2	15.2
Manufacturing total (500)	62.4	4.3	824	13.4	16.8
Mining only (97)	61.2	5.1	774	12.2	16.0
Mining total (183)	57.1	4.3	689	11.8	16.5
Federal lands only (35)	106.8	3.8	698	10.0	12.0
Federal lands total (210)	75.8	3.9	643	11.4	14.8
Government only (75)	76.5	9.9	2382	13.4	18.0
Government total (246)	66.6	7.0	1603	13.2	19.4
Poverty only (41)	45.3	3.4	535	13.5	29.9
Poverty total (238)	43.0	3.3	575	13.6	28.3
Retirement only (140)	79.1	4.5	841	16.9	16.0
Retirement total (420)	67.5	4.0	743	15.6	17.6

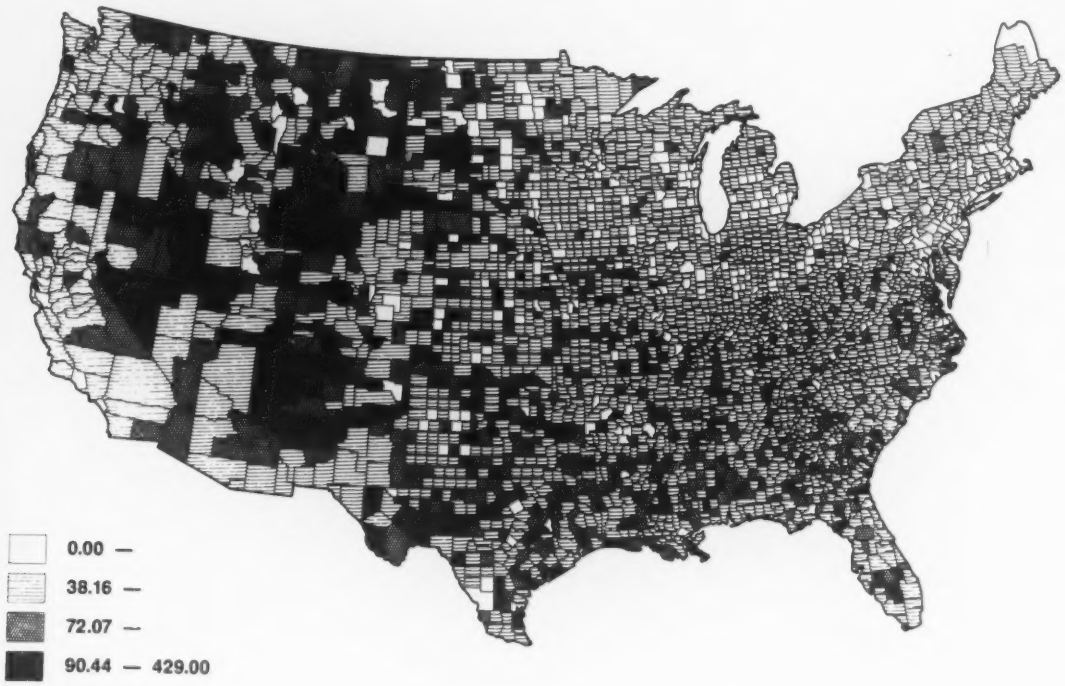
[a]282 nonmetropolitan counties with 50,000 or more population were excluded from analyses.

SOURCE: Kindig, D.A., et al., "Nonmetropolitan County Typology and Health Resources;" unpublished manuscript, Dec. 15, 1988.

Figure 6.--Areas With Cervical Cancer Mortality Rates Significantly Higher Than the U.S. Rate, and in the Highest 10% of all SEA Rates (White Females, 1970-1980)

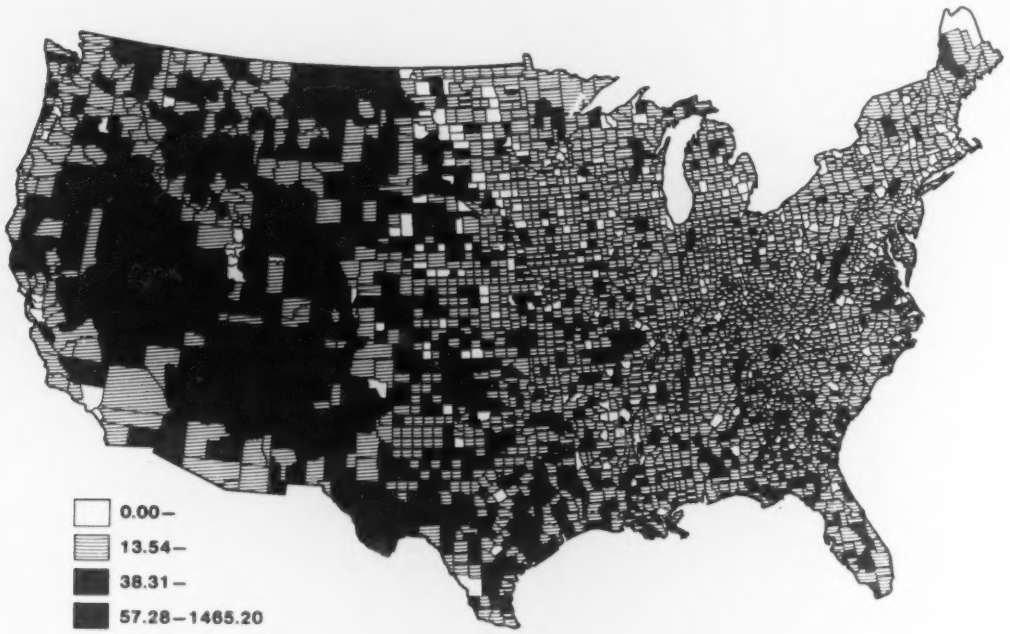
SOURCE: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, Atlas of U.S. Cancer Mortality Among Whites: 1950-1980, DHHS Pub. No. (NIH) 87-2900 (Bethesda, MD: 1987).

Figure 7.--Death Rates Due to Unintentional Injury by County



SOURCE: Baker, S.P., Whitfield, R.A., and O'Neill, B., "County Mapping of Injured Mortality," The Journal of Trauma 28(6):741-745, June 1988.

Figure 8.--Death Rates Due to Motor Vehicle Crashes by County



SOURCE: Baker, S.P., Whitfield, R.A., and O'Neill, B., "Geographic Variations in Mortality From Motor Vehicle Crashes," New England Journal of Medicine 316(22):1384-1387, May 28, 1987.

7. USING OMB AND CENSUS DESIGNATIONS TO IMPLEMENT HEALTH PROGRAMS

There is no uniformity in how rural areas are defined for purposes of Federal program administration and distribution of funds. Even within agencies different definitions may be used. This may occur when agencies implement programs or policies for which rural areas have been defined legislatively. For example, the MSA/nonMSA designations are used to categorize hospitals as urban or rural areas for purposes of hospital reimbursement under Medicare. On the other hand, in the case of clinics certified under the Rural Health Clinics Act, "rural" is defined as Census Bureau-designated nonurbanized areas. Certified clinics receive cost-based reimbursement from Medicare and Medicaid. These two examples of how the MSA and Census designations are used are described in more detail in the following section. Finally, the definition of "frontier" areas is described as it is used by the Department of Health and Human Services (DHHS).

Medicare Reimbursement: Using MSAs To Define Urban and Rural Areas

Several geographic designations affect hospital reimbursement under Medicare's prospective payment system (PPS). Different reimbursement rates are calculated for hospitals located in rural, large urban (population of more than a million),[1] and other urban areas. Under PPS, Congress directed the Health Care Financing Administration (HCFA) to define "rural" and "urban" hospitals as those located in nonmetropolitan and metropolitan areas, respectively.[2] On average, urban hospital per-case payments are 40 percent higher than those of rural hospitals because of differences in urban and rural standardized amounts, average wage and case-mix indexes, and other factors.

Rural hospitals designated as "sole community hospitals" are not subject to the same reimbursement methods as other rural hospitals.[3] These hospitals are "by reason of factors such as isolated location, weather conditions, travel conditions, or absence of other hospitals, the sole source of inpatient hospital services reasonably available in a geographic area to Medicare beneficiaries." An exception is also made for large nonmetropolitan hospitals that serve as "rural referral centers" for Medicare patients. These hospitals are reimbursed at the same rate as urban hospitals (58).

The rural/urban reimbursement differential has not been well-accepted by some hospitals. In some cases, the concerns of nonmetropolitan hospitals have prompted legislators to change the designation of the county in which the hospital is located from nonmetropolitan to metropolitan. The HCFA metropolitan/nonmetropolitan hospital reimbursement standards were modified by the Omnibus Reconciliation Act of 1987.[4] Some hospitals located in nonMSAs were reassigned to the urban (MSA) category. Accordingly, a hospital located in a nonmetropolitan county adjacent to one or more metropolitan area is treated as being in the metropolitan area to which the greatest number of workers in the county commute, if:

- the nonMSA county would otherwise be considered part of an MSA area but for the fact that the nonMSA county does not meet the standard relating to the

1 In New England County Metropolitan Areas (NECMAs), a large urban area includes a population of more than 970,000.

2 Certain nonmetropolitan New England counties were deemed to be parts of metropolitan areas for purposes of PPS.

3 The prospective payment rates for sole community hospitals equal 75 percent of the hospital-specific base payment rate plus 25 percent of the appropriate regional prospective payment rate (58).

4 Public Law 100-203 Sec. 4005.

rate of commutation between the non MSA county and the central county or counties of any adjacent MSA; and

- either 1) the number of residents of the nonMSA county who commute for employment to the central county or counties of any adjacent MSA is equal to at least 15 percent of the number of residents of the nonMSA county who are employed; or 2) the sum of the number of residents of the nonMSA county who commute for employment to the central county or counties of any adjacent MSA and the number of residents of any adjacent MSA who commute for employment to the nonMSA county is at least equal to 20 percent of the number of residents of the nonMSA county who are employed.

Thirty-nine nonMSA counties meet these standards (53 FR 38498).

Some hospitals dissatisfied with the rural/urban reimbursement differential have resorted to lawsuits in order to receive urban rates. For example, 28 hospitals in Missouri nonMSAs have sued DHHS, contending that MSA designations are not related to the costs of providing medical care and that DHHS underpays for the services provided to Medicare patients. Under the current regulations, a hospital in Jefferson City, for example, is paid less than a hospital in Columbia 30 miles away, because the first hospital is located outside an MSA (15). The National Rural Health Association has filed a class action suit against DHHS, charging that rural hospitals' Fifth Amendment rights to due process are being violated on two counts related to "unreasonably low reimbursement for rural hospitals" (16).

In a congressionally mandated study, DHHS examined the feasibility and impact of phasing out or eliminating separate urban and rural payment rates, retaining regional or hospital-specific rates, refining the wage index, and other alternatives to separate urban/rural rates (58). The study suggests that the PPS formula should be refined so that continuous measures are used to adjust a single reimbursement rate. HCFA is examining the feasibility of using severity measures as a more sensitive alternative to geographically based separate rates (65).

The Prospective Payment Assessment Commission (ProPAC), a body formed to make recommendations to the Congress on PPS, has stated that before it can make a recommendation to either maintain or eliminate separate urban and rural rates, it must better understand why there is an approximate 40 percent difference in average Medicare cost per case between urban and rural hospitals. This cost difference was present when the PPS rates were first established and has persisted through at least the first three years of PPS. The PPS rural/urban payment differential reflects poorly understood geographic practice pattern variations that cannot be attributed to measurable differences in patient characteristics, quality of care, or market area features. The issue is complicated by the unknown relationship between practice pattern variations, revenues, costs, and quality (34).

Defining Rural Labor Market Areas.-- The PPS formula includes a wage index adjustment that takes into account geographic differences in labor costs. A different wage index is applied to urban and rural labor market areas. Labor market areas are rather precisely defined for urban areas--each MSA is defined as a labor market area. In contrast, there is one rural labor market area defined for each State, which includes all nonMSA counties in that State.

Recognizing wide variation in hospital wage levels within these broadly defined labor markets, ProPAC has recommended that rural hospital labor market areas be redefined to distinguish between urbanized rural counties and other rural counties within each State. Accordingly, urbanized rural counties would be defined as counties with a city or town having a population of 25,000 or great-

er[5] (33). Analyses of 1982 data show average hospital wages in State's "urbanized rural counties" to be 8.5 percent higher than wages in "other rural counties" ($7.54 v. $6.95) (32). DHHS asserts that wage differentials are already taken into account to some degree through other PPS adjustments (i.e., the indirect medical education and disproportionate share adjustments) and the special treatment for rural referral centers (53 FR 38498).

ProPAC has also recommended (31,32,33) that definitions of urban hospital labor market areas be modified to include a distinction between an MSA's central urban and outlying areas. They suggest that urbanized areas within an MSA, as defined by the Bureau of the Census, could be distinguished from nonurbanized areas. DHHS has rejected this proposal, in part because of the difficulty of assigning a hospital to an urbanized area, the boundaries of which are defined below the MSA level. Determining whether or not a hospital is inside or outside of an urbanized area involves pinpointing the hospital location in terms of the smallest units of Census geography (the block or block group). In a study conducted for ProPAC (1), a process is described whereby the location of a hospital can be specified in terms of Census geography and then mapped to urbanized area boundaries. According to DHHS, however, defining labor markets below the county level would be confusing and difficult to administer.

The Rural Health Clinics Act

Ambulatory services can be reimbursed on an at-cost basis by Medicare and Medicaid if facilities and providers meet certification requirements of the Rural Health Clinics Act (Public Law 95-210). To be certified, a practice must be located in a rural area that is designated either as a health manpower shortage area (HMSA) or a medically underserved area (MUA). The practice must use a mid-level practitioner (physician assistant or nurse practitioner) at least 60 percent of the time that the practice is open. There has been renewed interest in this Act following an increase in the ceiling of reasonable costs reimbursed by Medicare and Medicaid programs. The payment cap is indexed to the Medicare Economic Index (36).[6]

Rural areas, for purposes of the Rural Health Clinics Act, are "areas not delineated as urbanized areas in the last census conducted by the Census Bureau." Nonurbanized areas encompass a larger area than either the nonMSA or Census-defined rural areas. Therefore, Rural Health Clinics can be located within an MSA (see figure 3) or in a nonMSA town with a population of 2,500 or more (such a town is urban according to the Census Bureau).

In summary, for purposes of hospital reimbursement under Medicare, the MSA designation is used (with certain specific exceptions) to distinguish urban from rural hospitals. Persistent MSA/nonMSA hospital cost differences have been noted since the PPS rates were first established, but it is likely that MSA location is an indirect measure of hospital cost. Hospital-specific measures are being sought to replace the MSA adjustment in the PPS formula.

Geographic designations are also used to define urban and rural labor market areas. Dissatisfaction with having only one rural labor market area per State (i.e., one labor market for all nonMSA counties) has led ProPAC to recommend two labor market areas for nonMSA counties. They have suggested recognizing as urbanized, nonMSA counties with a city or town with a population of 25,000 or greater (33). The average

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5 This definition of an urbanized rural county should not be confused with the Bureau of the Census definition of an urban or urbanized area.

6 These changes to the Rural Health Clinics Act were contained in the Budget Reconciliation Act of 1987.

hospital wage is 8.5 percent higher in urbanized rural counties than in nonurbanized rural counties (32). There are less than 125 nonMSA towns with 25,000 or more population, so few of the 2,393 nonMSA counties would be classified as urbanized (49). In fact, this distinction would create only 37 new areas (32).

Although HCFA has chosen not to use urbanized areas to refine labor market areas, HCFA does use urbanized area designations when certifying hospitals and clinics under the Rural Health Clinic Act. Rural Health Clinics must be located in nonurbanized areas that are designated as either a health manpower shortage area or a medically underserved area. This liberal interpretation of "rural" (e.g., it includes some areas within MSAs) seems appropriate, given the requirement that the area must also be medically underserved. This allows some medically underserved areas within MSAs--but isolated from an urbanized area by factors other than distance--to be certified.

Providing Services in "Frontier" Areas

Health services may be difficult to provide in large, sparsely populated areas. Areas with a population density of 6 persons per square mile or less, called "frontier" areas, are common West of the Mississippi river (30) (figure 9). In 1980, by this definition, there were at least 378 frontier counties with a total population of nearly 3 million persons (42). It may take an hour or more for residents of frontier areas to reach health providers and facilities. Frontier physicians tend to be generalists, solely responsible for a large service area, and have limited access to hospitals and health care technology (11). Recognizing the unique characteristics of frontier areas,[7] DHHS in early 1986 agreed to use different criteria to evaluate Community Health Center (CHC) grantees (and new applicants for CHC support) and National Health Service Corps sites.[8] Frontier areas were defined as (59):

> Those areas located throughout the country which are characterized by a small population base (generally 6 persons per square mile or fewer) which is spread over a considerable geographic area.

To be eligible for Bureau of Health Care Delivery and Assistance (BHCDA) support as a frontier area, the following service area criteria must be met (59):[9]

> **Service Area:** a rational area in the frontier will have at least 500 residents within a 25-mile radius of the health services delivery site or within the rationally established trade area. Most areas will have between 500 to 3,000 residents and cover large geographic areas.
>
> **Population Density:** the service area will have six or fewer persons per square mile.
>
> **Distance:** the service area will be such that the distance from a primary care delivery site within the service area to the next level of care will be more than 45 miles and/or the average travel time more than 60 minutes. When defining the "next level of care," we are referring to a facility with 24-hour emergency care, with 24-hour capability to handle an emergency caesarean section or a patient having a heart attack and some specialty mix to include at a minimum, obstetric, pediatric, internal medicine, and anesthesia services.

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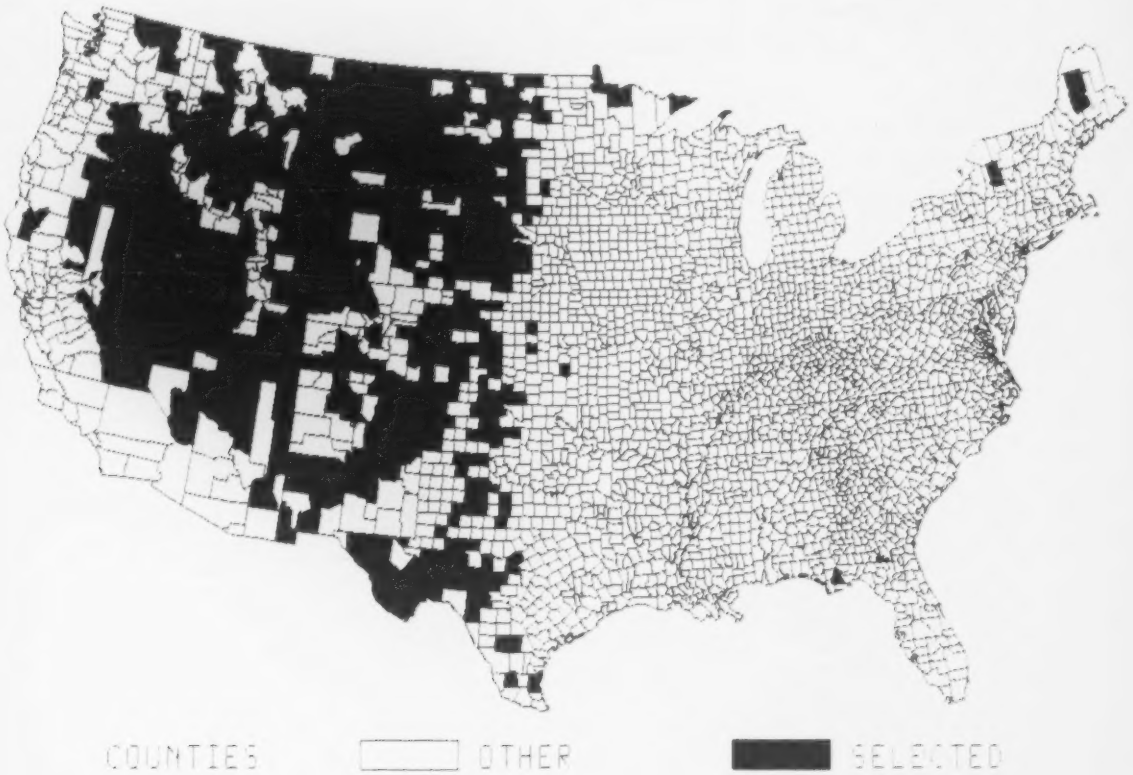
7 The Frontier Task Force of the National Rural Health Association (established in 1985) was instrumental in documenting the unique health care needs of rural areas (63).

8 The 1988 authorizing legislation for Public Health Service programs of assistance for primary health care included recommendations for DHHS to support primary health care planning, development, and operations in frontier areas (46).

9 If the eligibility criteria are not strictly met, an organization may justify any unusual circumstances which may qualify them as frontier, for example, geography, exceptional economic conditions, or special health needs (59).

Figure 9.--Frontier Counties: Population Density of 6 or Less



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Bureau of Health Professions, Office of Data and Management, Area Resource File, June 16, 1986.

Some State Health Departments have had trouble identifying service areas meeting these criteria (26). Whole counties can be identified as frontier areas on the basis of population density, but available sub-county geographic units are sometimes inadequate for identifying health service areas. Population data from the 1980 Census are available for sub-county areas such as Census County Divisions (CCDs), and Enumeration Districts (EDs) (see appendix D) but these areas can be large and may not represent a rational health service area.[10] ZIPCodes[11] may be aggregated to form a rational service area, but this poses some technical difficulties (19). Following the 1990 Census, Block Numbering Areas will be available for all nonurbanized areas (see appendix D.--1980 Census geography).[12]

It is useful to distinguish frontier area counties with evenly distributed small settlements from counties with one or two large population settlements and large areas with little or no settlement. For example, the health service needs of two frontier counties in New Mexico with similar population densities differ because of the way the populations are distributed. One county has a total population of approximately 8,000, of whom about 6,000 live in one town. In contrast, the other county has a total population of 2,500 living in six widely dispersed towns. If suitable sub-county areas were available, the Hoover Index, which measures population concentration or dispersion, could be used to distinguish between these counties. An automated geographic information system called TIGER (Topologically Integrated Geographic Encoding and Referencing System) has been developed[13] that will enhance the ability to conduct spatial analyses of population data from the 1990 decennial census (23).

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10 Some States have defined primary care service areas (e.g., New York).

11 Population data from the Census are available by ZIPCode. Some investigators have used ZIPCode-level census data to describe three types of rural area based upon density within zip code: semi-rural (density of 16 to 30 per square mile); rural (density 6 to 15 per square mile; and frontier (density less than 6 per square mile) (10).

12 In 1980, Block Numbering Areas were only available for nonurbanized places with over 10,000 population.

13 TIGER has been developed jointly by the U.S. Geological Survey and the U.S. Bureau of the Census.

8. CONCLUSIONS

The concepts of "rural" and "urban" exist as part of a continuum, but Federal policies generally rely on dichotomous urban/rural differences based on designations of the Office of Management and Budget (OMB) or the Bureau of the Census. OMB's MSA designation includes a large population center and adjacent counties that have a high degree of economic and social integration with that center. Census' urban areas include densely settled "urbanized areas" plus places with populations of 2,500 or more outside of urbanized areas. "Rural" areas are designated by exclusion: i.e., those areas not classified as either MSA or urban. About one-quarter of the U.S. population resides in nonMSAs and Census' rural areas. The identified populations are different but overlapping. Forty percent of the 1980 Census' rural population lived in MSAs, and 14 percent of the MSA population lived in rural areas.

"Nonmetropolitan area," "rural area," and "nonurbanized area" have all been used to display vital and health statistics or to implement Federal policies. These "rural" definitions can be analyzed in terms of how well they include "rural areas" and how well they exclude "urban areas." For example, we intuitively associate farming with "rural" but about one-fourth of farm residents live in MSAs (55). Some might argue that isolated towns with just over 2,500 residents are inappropriately excluded from the Census' rural definition. Others may argue that when nonMSAs are defined as rural, over 100 towns with populations of 25,000 or more are inappropriately included. Moreover, when MSAs are used to define "urban" in spatially large counties, small towns that are far from an urbanized area are inappropriately called urban.

Dichotomous measures of urbanity/rurality obscure important differences between urban and rural areas and wide variations within a rural area. Consequently, there have been recommendations to implement a standard rural typology that would capture the elements of rural diversity and improve use and comparison of data. Nine county-based rural/urban typologies or classification schemes that incorporate one or more of the following measures are reviewed in this paper: population size and density; proximity to and relationship with urban areas; degree of urbanization; and principal economy. While a standard typology may seem desirable, it will be difficult to arrive at, because the different typologies are designed and have merit for various purposes, some of which conflict.

For purposes of health services planning and research, a typology based on largest settlement size is useful, because the level of available health resources is likely to be related to the size of a city. In spatially small counties, large settlements are likely to be quite accessible to all county residents. In the West, however, counties can be several times as large as in the East, and some measure of proximity would be useful. A measure of population concentration and dispersion, or distance to a large settlement, could serve as an indicator of access to those services. Of the typologies reviewed in this paper, the one likely to best measure both level of and access to services is a typology that incorporates a county's largest settlement and the county's adjacency to an MSA. Other typologies that categorize counties according to employment and commuting patterns could be used to refine the definition of labor market areas, an important component of the Medicare prospective payment system (PPS) formula.

Rural areas are not defined uniformly for purposes of Federal program administration or distribution of funds. Different designations may, in fact, be used by the same agency. For example, Congress has directed the Health Care Financing Adminis-

tration to use OMB's MSA designations to categorize hospitals as urban or rural for purposes of hospital reimbursement under Medicare, but to use Census' nonurbanized area designation to certify health facilities under the Rural Health Clinics Act.

The relative merits of county-based typologies for particular applications can be evaluated by using the Area Resource File (ARF), a county-level data base maintained by the Health Resources and Services Administration. In addition, visual aids such as maps can effectively serve as an analytic device to illustrate geographic variation in health status and access to health care resources and could further the development and evaluation of typologies. In the spatially large Western counties, sub-county geographic units need to be employed to help identify health service areas with special characteristics such as those that are "frontier" (i.e., have 6 or fewer persons per square mile).

The choice of definition for "rural" that is used to present demographic and health data can make a substantive difference. For example, whether a disproportionate number of rural residents are elderly depends on how rural is defined. Furthermore, wide variations in health status indicators within nonmetropolitan areas will not be apparent unless nonmetropolitan data are disaggregated by region, urbanization, proximity to urban areas, or other relevant factors.

APPENDIX A: SUMMARY OF THE STANDARDS FOLLOWED IN ESTABLISHING METROPOLITAN STATISTICAL AREAS

This statement summarizes in nontechnical language the official standards for designating and defining metropolitan statistical areas. It omits certain exceptions and unusual situations that are covered in the standards themselves or in the detailed statement of the procedures followed in applying the standards.

Population Size Requirements for Qualification (Section 1)

To qualify for recognition as a metropolitan statistical area, an area must either have a city with a population of at least 50,000 within its corporate limits, or it must have a U.S. Bureau of the Census urbanized area of at least 50,000 population, *and* a total metropolitan statistical area population of at least 100,000. A few metropolitan statistical areas that do not meet these requirements are still recognized because they qualified in the past under standards that were then in effect.

The Census Bureau defines urbanized areas according to specific criteria, designed to include the densely settled area around each large city. An urbanized area must have a population of at least 50,000. The urbanized area criteria define a boundary based primarily on a population density of at least 1,000 persons per square mile, but also include some less densely settled areas within corporate limits, and such areas as industrial parks, railroad yards, golf courses, and so forth, if they are adjacent to dense urban development. The density level of 1,000 persons per square mile corresponds approximately to the continuously built-up area around the city, for example, as it would appear in an aerial photograph.

Typically, the entire urbanized area is included within one metropolitan statistical area; however, the metropolitan statistical area is usually much larger in areal extent than the urbanized area, and includes territory where the population density is less than 1,000 persons per square mile.

Central County(ies) (Section 2)

Every metropolitan statistical area has one or more central counties. These are the counties in which at least half the population lives in the Census Bureau urbanized area. There are also a few counties classed as central even though less than half their population lives in the urbanized area because they contain a central city (defined in Section 4), or a significant portion (with at least 2,500 population) of a central city.

Outlying Counties (Section 3)

In addition to the central county(ies), a metropolitan statistical area may include one or more outlying counties. Qualification as an outlying county requires a significant level of commuting from the outlying county to the central county(ies), and a specified degree of "metropolitan character." The specific requirements for including an outlying county depend on the level of commuting of its resident workers to the central county(ies), as follows:

1. Counties with a commuting rate of 50 percent or more must have a population density of at least 25 persons per square mile.
2. Counties with a commuting rate of 40 to 50 percent can qualify if they have a density of at least 35 persons per square mile.
3. Counties with a commuting rate of 25 to 40 percent typically qualify through having either a density of at least 50 persons per square mile, or at least 35 percent of their population classified as urban by the Bureau of Census.
4. Counties with a commuting rate of 15 to 25 percent must have a density of at least 50 persons per square mile, and in

addition must meet two of the following four requirements:

- the population density must be at least 60 persons per square mile;
- at least 35 percent of the population must be classified as urban;
- population growth between 1970 and 1980 must be at least 20 percent; and
- a significant portion of the population (either 10 percent or at least 5,000 persons) must live within the urbanized area.

There are also a few outlying counties that qualify for inclusion in a metropolitan statistical area because of heavy commuting *from* the central county(ies) *to* the outlying county, or because of substantial total commuting to and from the central counties.

Central Cities (Section 4)

Every metropolitan statistical area has at least one central city, which is usually its largest city. Smaller cities are also identified as central cities if they have at least 25,000 population and meet certain commuting requirements.

In certain smaller metropolitan statistical areas there are places between 15,000 and 25,000 population that also qualify as central cities, because they are at least one-third the size of the metropolitan statistical area's largest city and meet commuting requirements.

Most places that qualify as central cities are legally incorporated cities. It is also possible for a town in the New England States, New York, or Wisconsin, or a township in Michigan, New Jersey, or Pennsylvania to qualify as a central city. The town or township must, however, be recognized by the Bureau of the Census as a "census designated place" on the basis of being entirely urban in character, and must also meet certain population size and commuting requirements.

Consolidating or Combining Adjacent Metropolitan Statistical Areas (Sections 5 and 6)

These two sections specify certain conditions under which adjacent metropolitan statistical areas defined by the preceding sections are joined to form a single area. Section 5 consolidates adjacent metropolitan statistical areas if their commuting interchange is at least 15 percent of the number of workers living in the smaller of the two areas. To be consolidated under Section 5, each of the metropolitan statistical areas must also be at least 60 percent urban, and the total population of the consolidated metropolitan statistical area must be at least a million.

Section 6 provides for combining as a single metropolitan statistical area those adjacent metropolitan statistical areas whose largest cities are within 25 miles of each other, unless there is strong evidence, supported by local opinion, that they do not constitute a single area for general social and economic purposes.

Levels (Section 7)

This section classifies the prospective metropolitan statistical areas defined by the preceding sections into four categories based on total population size: Level A with a million or more; Level B with 250,000 to a million; Level C with 100,000 to 250,000; and Level D with less than 100,000.

Under this section, the metropolitan statistical areas in Levels B, C, and D (those with a population of less than 1 million) receive final designation as metropolitan statistical areas.

Area Titles (Section 8)

This section assigns titles to the metropolitan statistical areas defined by the preceding sections.

Primary and Consolidated Metropolitan Statistical Areas (Sections 9 through 11)

Within the metropolitan statistical areas classified as Level A, some areas may qualify for separate recognition as primary metropolitan statistical areas. A primary metropolitan statistical area is a large urbanized county, or cluster of counties, that demonstrates very strong internal economic and social links, in addition to close ties to the other portions of the Level A metro-politan statistical area.

Section 9 through 11 provide a framework for identifying primary metropolitan statistical areas within metropolitan statistical areas of at least 1 million population. A metropolitan statistical area in which primary metropolitan statistical areas have been identified is designated a consolidated metropolitan statistical area.

Metropolitan Statistical Areas in New England (Sections 12 through 14)

These sections provide the basic standards for defining metropolitan statistical areas in New England.

Qualification for recognition as a metropolitan statistical area in New England is on much the same basis as in the other States. A few modifications in the standards are necessary because cities and towns are used for the definitions. In New England each Census Bureau urbanized area of at least 50,000 normally has a separate metropolitan statistical area, provided there is a total metropolitan statistical area population of at least 75,000 or a central city of at least 50,000. The total metropolitan statistical area population requirement is lower than the 100,000 required in the other States because the New England cities and towns used in defining metropolitan statistical areas are much smaller in areal extent than the counties used for the definitions in the other States. This makes it possible to define New England metropolitan statistical areas quite precisely on the basis of population density and commuting.

For users who prefer definitions in terms of counties, a set of New England County Metropolitan Areas is also officially defined. However, the official metropolitan statistical area designations in New England apply to the city-and-town definitions.

In order to determine the cities and towns which could qualify for inclusion in a New England metropolitan statistical area, section 12 defines a *central core* for each New England urbanized area, consisting essentially of cities and towns in which at least half the population lives in the urbanized area or in a contiguous urbanized area.

Once the central core has been defined, Section 13 reviews the adjacent cities and towns for possible inclusion in the metropolitan statistical area. An adjacent city or town with a population density of at least 100 persons per square mile is included if at least 15 percent of its resident workers commute to the central core. Towns with a density between 60 and 100 persons per square mile also qualify if they have at least 30 percent commuting to the central core. However, the commuting to the central core from the city or town must be greater than to any other central core, and also greater than to any nonmetropolitan city or town.

If a city or town has qualifying commuting in two different directions (e.g., to a central core and to a nonmetropolitan city) and the commuting percentages are within five points of each other, local opinion is solicited through the appropriate congressional delegation before assigning the city or town to a metropolitan statistical area. Some New England communities also qualify for inclusion in a metropolitan statistical area on the basis of reverse commuting or total commuting.

Once the qualifying outlying towns and cities have been determined, Section 14 qualifies the resulting area as a metropolitan statistical area provided it has a city of at

least 50,000 or a total population of at least 75,000. This section also specifies that several of the standards used in the other States are also applied to the New England States:

1. The central cities of each area are determined by Section 4.
2. Two adjacent New England metropolitan statistical areas may be consolidated under Section 5.
3. New England areas are categorized into levels according to Section 7A. Those in Levels B, C, and D are given final designation as metropolitan statistical areas, and are assigned titles according to Section 8.

Primary and Consolidated Metropolitan Statistical Areas in New England (Sections 15 and 16)

Section 15 is used to review each Level A metropolitan statistical area in New England for the possible identification of primary metropolitan statistical areas. It follows the same general approach as is used for identifying such areas outside New England (Section 9). Finally, Section 16 provides that level and titles for New England primary and consolidated metropolitan statistical areas are determined by much the same standards as for the remaining States.

Note: OMB is reviewing the MSA standards and will publish them with some revisions before Apr. 1, 1990 (12).

SOURCE: Excerpt from "The Metropolitan Statistical Area Classification: 1980 Official Standards and Related Documents," The Federal Committee on Standard Metropolitan Statistical Areas.

APPENDIX B: THE CENSUS BUREAU'S URBANIZED AREA DEFINITION

The major objective of the Census Bureau in delineating urbanized areas is to provide a better separation of urban and rural population and housing in the vicinity of large cities. An urbanized area consists of a central city or cities and surrounding closely settled territory or "urban fringe."

There are 366 urbanized areas delineated in the United States for the 1980 census. There are seven urbanized areas delineated in Puerto Rico.

The following criteria are used in determining the eligibility and definition of the 1980 urbanized areas.[1]

An urbanized area comprises an incorporated place[2] and adjacent densely settled surrounding area that together have a minimum population of 50,000.[3] The densely settled surrounding area consist of:

1. Contiguous incorporated places or census-designated places having:
   - a population of 2,500 or more; or
   - a population of fewer than 2,500 but having either a population density of 1,000 persons per square mile, closely settled area containing a minimum of 50 percent of the population, or a cluster of at least 100 housing units.

2. Contiguous unincorporated area which is connected by road and has a population density of at least 1,000 persons per square mile.[4]

3. Other contiguous unincorporated area with a density of less than 1,000 persons per square mile, provided that it:
   - eliminates an enclave of less than 5 square miles which is surrounded by built-up area;
   - closes an indentation in the boundary of the densely settled area that is no more than 1 mile across the open end and encompasses no more than 5 square miles; and
   - links an outlying area of qualifying density, provided that the outlying area is:
     --connected by road to, and is not more than 1½ miles from, the main body of the urbanized area; and
     --separated from the main body of the urbanized area by water or other undevelopable area, is connected by road to the main body of the urbanized area, and is not more than 5 miles from the main body of the urbanized area.

4. Large concentrations of nonresidential urban area (e.g., industrial parks, office areas, and major airports), which have at least one-quarter of their boundary contiguous to an urbanized area.

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1 All references to population counts and densities relate to data from the 1980 census.

2 In Hawaii, incorporated places do not exist in the sense of functioning local governmental units. Instead, census-designated places are used in defining a central city and for applying urbanized area criteria.

3 The rural portions of extended cities, as defined in the Census Bureau's extended city criteria, are excluded from the urbanized area. In addition, for an urbanized area to be recognized, it must include a population of at least 25,000 that does not reside on a military base.

4 Any area of extensive nonresidential urban land use, (e.g., railroad yards, airports, factories, parks, golf courses, and cemeteries) is excluded in computing the population density.

Note: The Census Bureau is reviewing the urbanized area rules and will publish them with some revisions by 1990.

SOURCE: Excerpt from *1980 Census of Population Vol. 1, Characteristics of the Population*, Appendix A. Area Classifications.

CENSUS GEOGRAPHY—CONCEPTS

INTRODUCTION

It is important for anyone using census data to be aware of the geographic concepts involved in taking the census and allocating the statistics to States, counties, cities, and smaller areas down to the size of a city block. Preparing for and taking a census also results in a number of geographic tools or products that are helpful to the data user as well as to the Census Bureau, in activities such as computerized location coding, mapping, and graphic display. They also allow users to interrelate local and census statistics for a variety of planning and administrative purposes. This *Factfinder* explains the Census Bureau's geographic concepts and products.

Except where noted, the definitions and references below are those used for the 1980 Census of Population and Housing. Figure 10 on page 6 summarizes the geographic areas for which data are available from other Bureau censuses and surveys.

Data summarizes are presented in printed reports 🕮, microfiche ▦, and computer tapes 💿 and flexible diskettes 🖬, based on tabulations for the geographic and statistical levels discussed below. Maps ⊞ are also available. The symbols * and +, keyed to the legend on page 3, indicate how to obtain the items described in this brochure.

REPORTING AREAS

There are a number of basic relationships, illustrated below, among the geographic areas the Census Bureau uses as "building blocks" in its reports. Some of the areas are governmental units, i.e., legally defined entities, while other areas are defined specifically for statistical purposes. (The statistical areas are italicized in the diagrams; all others are governmental.)

- **United States**—The 50 States and the District of Columbia. (Data also are collected separately for Puerto Rico and the outlying areas under U.S. sovereignty or jurisdiction.)

- **Regions/divisions**—There are four census regions defined for the United States, each composed of two or more geographic divisions. The nine divisions are groupings of States. (See fig. 1.)

Figure 1. CENSUS REGIONS AND GEOGRAPHIC DIVISIONS OF THE UNITED STATES

*The Midwest Region was designated as the North Central Region until June 1984.

- **Governmental units of the Nation**—States (50) and the District of Columbia
  Counties and their equivalents (3,139, plus 78 in Puerto Rico)
  Minor civil divisions (MCD's) of counties, such as towns and townships (approximately 25,000)
  Incorporated places (about 19,100), e.g., cities and villages
- *Census county divisions (CCD's)*—In 20 States where MCD's are not adequate for reporting subcounty census statistics, Bureau and local officials delineated 5,512 CCD's (plus 37 census subareas in Alaska) for this purpose.
- *Census designated places (CDP's)*—Formerly referred to as "unincorporated places," CDP's (about 3,500) are closely settled population centers without legally established limits, delineated with State and local assistance for statistical purposes, and generally have a population of at least 1,000.

Figure 2. NATIONAL GEOGRAPHIC RELATIONSHIPS

* Note that places (incorporated and census designated) are not shown within the county and county subdivision hierarchy, since places may cross the boundaries of these areas. A few census reports and tape series do show places within MCD or CCD within county, but in these cases data pertain only to that part of a place which is within a particular higher-level area. Enumeration district and block-group summaries do recognize place boundaries, making ED's and BG's important as the lowest common denominator for the higher-level entities.

- *Census tracts*—These statistical subdivisions of counties (approximately 43,350, including 463 in Puerto Rico), average 4,000 inhabitants. They are delineated (subject to Census Bureau standards) by local committees for metropolitan areas and roughly 200 other counties.
- *Blocks*—Generally bounded by streets and other physical features, blocks (approximately 2.5 million) are identified (numbered) in and adjacent to urbanized areas, most incorporated places of 10,000 or more population, and other areas that contracted with the Census Bureau to collect data at the block level. (Fig. 8 illustrates the extent of block-statistics coverage in part of a State.) Five States are completely block-numbered.
- *Block-numbering areas (BNA's)*—Areas (approximately 3,400, including over 100 in Puerto Rico) defined for the purpose of grouping and numbering blocks where census tracts have not been established.
- *Block groups (BG's)*—Subdivisions of census tracts or BNA's, BG's (about 200,000) comprise all blocks with the same first digit in a tract or BNA. Averaging 900 population, BG's appear in areas with numbered blocks in lieu of ED's (see below) for tabulation purposes.
- *Enumeration districts (ED's)*—An ED is a Bureau administrative area assigned to one census enumerator. ED's (about 100,000 nationwide) were used for census tabulation purposes where census blocks were not numbered. ED size varies considerably, but averages 500 inhabitants.

Metropolitan Areas

- *Standard metropolitan statistical areas (SMSA's)*—An SMSA (defined by the Office of Management and Budget) comprised one or more counties around a central city or urbanized area with 50,000 or more inhabitants. Contiguous counties were included if they had close social and economic links with the area's population nucleus. There were 323 SMSA's, including 4 in Puerto Rico.
- *Standard consolidated statistical areas (SCSA's)*—SCSA's (17, including 1 in Puerto Rico) were composed of two or more adjacent SMSA's having a combined population of 1 million or more, and with close social and economic links.

After the relationships between central urban core(s) and adjacent counties were analyzed on the basis of the 1980 population census and a revised set of criteria, these areas were redefined and the word "standard" was dropped from the titles. Thus, on June 30, 1983, SMSA's and SCSA's were redesignated as

- *Metropolitan statistical areas (MSA's)*
- *Consolidated MSA's (CMSA's)*

and

- *Primary MSA's (PMSA's)*

As the 1982 Economic Censuses covered calendar year 1982, prior to the June 1983 date for adopting the changes, the 1982 SMSA and SCSA designations and nomenclature were retained for those censuses. Some data from the 1980 Census of Population and Housing were retabulated by MSA and issued in special reports, and the new definitions were used in preparing population and migration estimates and in presenting current statistics from 1983 onward.

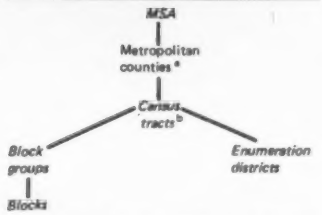
- *Urbanized areas (UA's)*—A UA (there are 373, including 7 in Puerto Rico) consists of a central city and surrounding densely settled territory with a combined population of 50,000 or more inhabitants. (See fig. 5)
- *Metropolitan/nonmetropolitan*—"Metropolitan" includes all population within MSA's; "nonmetropolitan" comprises everyone elsewhere.
- *Urban/rural*—The urban population consists of all persons living in urbanized areas and in places of 2,500 or more inhabitants outside these areas. All other population is classified as rural. The urban and rural classification cuts across the other hierarchies; there can be both urban and rural territory within metropolitan as well as nonmetropolitan areas.

There are other geographic units for which data may be obtained from the 1980 Census of Population and Housing. Some appear in regular publications and data files: American Indian reservations (278, both State and Federal, including 3 administered by or for more than one tribe), Alaska Native villages (209), congressional districts (435), and election precincts in some States. Data are prepared for neighborhoods in almost 1,300 areas and by ZIP Code areas nationwide. Data for other areas are generated in special tabulations prepared at cost, for example, school districts.

Two types of areas are defined specifically for the economic censuses:

- *Central business districts (CBD's)*—CBD's are areas of high land value, traffic flow, and concentration of retail businesses, offices, theaters, hotels, and service establishments. In the 1982 Census of Retail Trade, 456 CBD's were defined in (1) any SMSA central city and (2) any other city with a population of 50,000 or more and a sufficient concentration of economic activity. CBD's also are shown in place-of-work data from the 1980 Census of Population and Housing.
- *Major retail centers (MRC's)*—MRC's are concentrations of retail stores located in SMSA's, but outside the CBD's. For 1982, 1,545 MRC's were defined areas with at least 25 retail establishments and one or more large general merchandise or department stores.

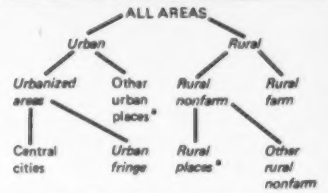
Figure 3. GEOGRAPHIC RELATIONSHIPS IN AN MSA



[a] In New England, MSA's are defined in terms of towns and cities, rather than counties (as in the rest of the country).

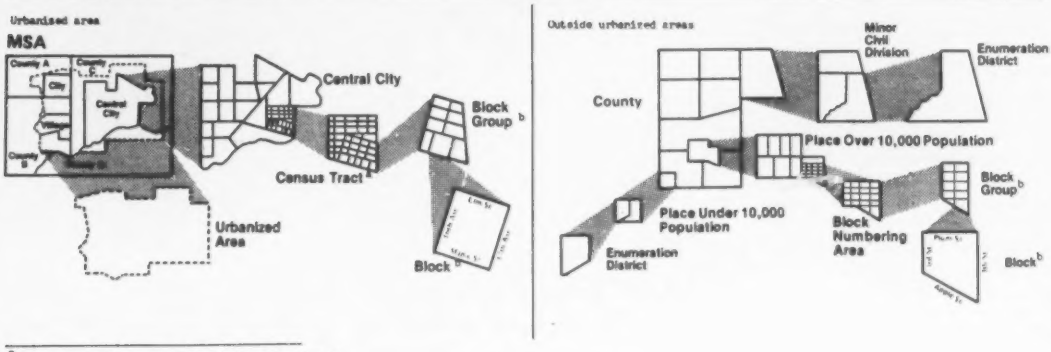
[b] Census tracts subdivide most MSA counties as well as about 200 other counties. As tracts may cross MCD and place boundaries, MCD's and places are not shown in this hierarchy.

Figure 4. URBAN/RURAL GEOGRAPHIC RELATIONSHIPS



[a] Includes both governmental and statistical units.

Figure 5. GEOGRAPHIC HIERARCHY INSIDE AND OUTSIDE URBANIZED AREAS (UA's)
(See figures 7-10 for maps exhibiting most of these features.)



[a] The entire MSA is subdivided into census tracts.

[b] Blocks and block groups do not have symbolized boundaries as do the other areas, but are identified by number. (See discussion on page 2.)

SOURCE: U.S. Department of Commerce, Bureau of the Census, "Census and Geography-Concepts and Products," Factfinder CFF No. 8 (Rev.) Washington, DC: U.S. Government Printing Office, August 1985).

The Bureau collects and publishes data for two kinds of sub-state areas:

Governmental, such as--

- incorporated places (e.g., cities, villages) and minor civil divisions (MCDs) of counties (e.g., townships),
- congressional districts and election precincts, and
- American Indian reservations and Alaska Native villages.

Statistical, including--

- standard metropolitan statistical areas (SMSAs) and standard consolidated statistical area (SCSAs) were used in the 1980 decennial and 1982 economic censuses. In 1983, SMSAs and SCSAs were replaced by metropolitan statistical areas (MSAs), primary MSAs (PMSAs), and consolidated MSAs (CMSAs);
- census county divisions (CCDs) in States where MCD boundaries are not satisfactory for statistical purposes;
- census-designated places (formerly called "unincorporated places");
- urbanized areas;
- census tracts (subdivisions of counties, primarily in metropolitan areas) and block numbering areas (BNAs), averaging about 4,000 people each;
- census blocks--generally equivalent to city blocks in cities, but are very large in rural areas;
- enumeration districts (EDs)--census administrative areas, averaging around 700 inhabitants, used where block statistics are not available;
- block groups (BGs)--counterparts to EDs averaging 900 population, in areas with census blocks;
- neighborhoods--subareas locally defined by participants in the Bureau's Neighborhood Statistics Program; and
- ZIPCodes--Postal Service administrative areas independent of either governmental or other statistical units.

In the 1982 Census of Retail Trade, the Bureau published data for central business districts (CBDs) and major retail centers (MRCs) outside CBDs; in the Census of Governments, for school districts and other special districts; and in foreign trade and international research, for countries and world areas.

Generally, survey data are published only for the larger areas, such as the United States, its regions, and some States, while census data are made available for smaller areas as well.

Population and Housing

The decennial census of population and housing is the most important source of data for small communities, not only on a wide variety of subjects but in finer geographic detail than from any other statistical base. It provides a uniform set of data for intercommunity comparisons as well.

Table A-1 shows the items collected in the census. The basic data, called "complete count" or "100-percent," come from the questions asked for every person and housing unit. Other items are obtained only at a sample of households and housing units in order to keep response burden to a minimum.

The 100-percent data provide the basic population and housing counts and certain characteristics--e.g., age, sex, and race for people; and value or rent, and vacant or occupied status for housing units--for all tabulation areas, even down to census blocks. Since they are estimates rather than complete counts, the sample statistics for small communities must be used with caution.

In general, the higher the geographic or statistical level of tabulation, the greater amount of detail there is available in the census reports. With respect to small communities, more data usually are contained in the printed reports at the county level than for the county subdivisions and places. (This difference seldom occurs on summary tape files or selected microfiche). Only limited county- and subcounty-level data are available on flexible diskettes and through CENDATA.

Table A-1.--Items Collected in the 1980 Census

100-percent population items

- Household relationship[a]
- Sex
- Race
- Age
- Marital status
- Spanish/Hispanic origin or descent[a]

Sample population items

- School enrollment
- Education attainment
- State or foreign country of birth
- Citizenship and year of immigration
- Current language and English proficiency[b]
- Ancestry[b]
- Place of residence 5 years ago
- Activity 5 years ago
- Veteran status and period of service
- Presence of disability or handicap[a]
- Children ever born
- Marital history
- Employment status last week
- Hours worked last week
- Place of work
- Travel time to work[b]
- Means of transportation to work[a]
- Persons in carpool[b]
- Year last worked
- Industry
- Occupation
- Class of worker
- Amount of income by source in 1979[a]
- Work in 1979 and weeks looking for work in 1979[a]

100-percent housing items

- Number of housing units at address
- Complete plumbing facilities[a]
- Number of rooms in unit
- Tenure (whether the unit is owned or rented)
- Condominium identification[a]
- Value of home (for owner-occupied units and condominiums)
- Rent (for renter-occupied units)
- Vacant for rent, for sale, etc., and period of vacancy

Sample housing items

- Number of units in structure
- Stories in building and presence of elevator
- Year unit built
- Year moved into this house[a]
- Source of water
- Sewage disposal
- Heating equipment
- Fuels used for home heating, water-heating, and cooking
- Costs of utilities and fuels[a]
- Complete kitchen facilities
- Number of bedrooms and bathrooms
- Telephone
- Air conditioning
- Number of automobiles
- Number of light trucks and vans[b]
- Homeowner shelter costs for mortgage, real estate taxes, and hazard insurance[b]

[a]Changed relative to 1970.
[b]New item for 1980.

Derived items (illustrative examples)

- Families
- Family type and size
- Family income
- Poverty status
- Population density
- Household size
- Persons per room ("overcrowding")
- Institutions and other group quarters
- Farm residence

Note: This information pertains to the 1980 census and does not reflect changes in data presentation and availability following the 1990 census.

SOURCE: Adapted from "Data for Small Communities," U.S. Bureau of the Census--FACTFINDER for the Nation, CFF No. 22 (Rev.) January 1986.

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Advisory Panel members provide valuable guidance during the preparation of OTA reports. However, the presence of an individual on the Advisory Panel does not mean that individual agrees with or endorses the conclusions of this particular paper.

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